THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

Vol. XXII. No. 554.] LONDON, DECEMBER 16, 1873. [25th Year.] Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.

The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.

RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.

GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.

Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.

Address G. H. Ramsay, Newcastle-on-Tyne.

GEORGE GLOVER & CO.,

Patentees of the Standard Gasometers for the Government, and of the

IMPROVED DRY GAS-METERS.

These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.

To meet the increasing demand, G. Glover and Co. have just entered on possession of extensive premises adjoining their present Works in Ranelagh Road, and they are now prepared to execute promptly, orders to any extent. They keep in stock all sizes of Meters up to 200 lights. In cases of haste, on the receipt of a telegram early on one day, their Meters can be delivered next day in any part of England, and in the large towns in Scotland.

Particulars and lists of prices forwarded on application to—

RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW;
OR
15, MARKET STREET, MANCHESTER.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, BLAYDON-ON-TYNE,

Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COALS.
Coal Office,
Quay Side, Newcastle-on-Tyne.

Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

JOHN RUSSELL AND CO.,

THE OLD TUBE-WORKS, WEDNESBURY
AND
THE ALMA WORKS, WALSALL.

Established at the commencement of Gas Lighting.

Warehouses:
69, UPPER THAMES STREET;
COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
} LONDON

35, 36, 37, & 39, GRANBY ROW, MANCHESTER.

J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.

Lists may be obtained on application to
69, UPPER THAMES STREET, LONDON.

JOHN BENT & SON,

BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
OF
FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.

Established 1830.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS,
Near Newcastle-on-Tyne.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents: JAMES LAWRIE & CO.,
63, Old Broad Street, City, London.

SCOTTISH CANNEL COAL.

J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.

They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.

Messrs. Romans, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.

Analysis, prices, and other information will be forwarded on application to their Offices, 8, Forth Street, Edinburgh; 1, Walbrook, Mansion House, London, or to the "Crown Wharf," Thomas Street, Limehouse, London, where stocks of house, steam, and gas coal are always on hand.

Coal, machinery, fire goods, &c., shipped to all parts of the world.

JOURNAL OF GAS LIGHTING,

Water Supply, & Sanitary Improvement.

ON AND AFTER JANUARY 6th, 1874, the Journal will be published Weekly, price—

Single Copies, 6d.; by Post, 6½d.

Subscriptions.

Yearly (if paid in advance, in January)	21s. 0d.
Half Yearly (Do. do. in Jan. or July)	10s. 6d.
Yearly (on Credit)	25s. 0d.
Half Yearly (Do.)	12s. 6d.

Advertisements.

Six Lines and under (*Single Column*)	£0 3 0
Each Additional Line	0 0 6
A Whole Page	5 5 0

No extra charge for Blocks, nor for Advertisements displayed across the entire page; such Advertisements will be charged according to space occupied, at the rate of Five Guineas per page.

London:
William B. King, 11, Bolt Court, Fleet Street, E.C.

GEORGE GLOVER AND CO.,

Patentees of the Standard Gasometers for the Government,

TWO MEDALS,

LONDON, 1862.

HAVE OBTAINED THE

HIGHEST

PRIZE

FOR

SILVER MEDAL,

PARIS, 1867.

IMPROVED DRY GAS-METERS AND GASOMETERS,

AT THE

PARIS EXHIBITION.

RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;

AND 236, GEORGE STREET, GLASGOW.

HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS,

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

London Agent—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

For Gas, Steam, Water, &c.

SOLE LICENSEES AND MANUFACTURERS for the United Kingdom of

THE LAVENANT PATENT ENAMELLED TUBES AND FITTINGS.

LAP-WELDED IRON & HOMOGENEOUS METAL TUBES

For Locomotive, Marine, and Stationary Boilers.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

WAREHOUSES:

LONDON: No. 157, Upper Thames Street, E.C. LIVERPOOL: No. 63, Paradise Street. MANCHESTER: Barlow's Croft, Chapel Street, Salford. PARIS and LILLE.

LAMBERT BROTHERS, WALSALL.

ALPHA TUBE & FITTING WORKS

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW.

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges,

Governors, Test Holders, &c., &c.

LONDON OFFICE: 106, CANNON STREET, E.C.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

London Agent: W. G. DAVIS, 2, BRABANT COURT, PHILPOT LANE, E.C.

PARIS, 1867.

CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.

CLASSES 13 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS.

LAMP METERS AND BOXES

IMPROVED LOWE'S JET PHOTOMETERS.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

EDWARD E. CROMBIE & CO.,

(SUCCESSORS TO N. DEFRIES AND CO.,)

DIANA PLACE, EUSTON ROAD, LONDON,

MANUFACTURERS OF

PATENT DRY TWO AND THREE DIAPHRAGM GAS-METERS,

GUARANTEED TO POSSESS THE FOLLOWING ADVANTAGES:—

Steadiness of Light; Correct Registering of Gas; Great Durability;
Cannot be Affected by Frost; Protection to Consumer and Supplier from Fraud.

UPHELD FOR FIVE YEARS FREE OF CHARGE.

PRIZE MEDALS — LONDON, 1851, & PARIS, 1867.

Mr. R. K. MOORHOUSE (late of T. Glover & Co.'s) will represent this Firm in the Provinces.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

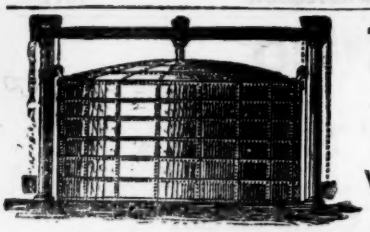
FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.



W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD

MANUFACTURERS OF

RETORTS, ANNULAR AND PIPE CONDENSERS,

WROUGHT AND CAST IRON SCRUBBERS, PURIFIERS, GASHOLDERS,

GOVERNORS, AND ALL THE NECESSARY FITTINGS FOR COMPLETING THE ERECTION OF GAS-WORKS.

STATION & CONSUMERS WET OR DRY METERS, STREET & SERVICE MAINS, LAMP COLUMNS & BRACKETS, & WROUGHT-IRON TUBES AND FITTINGS; WROUGHT-IRON ROOFS FOR ANY SIZE OF BUILDINGS.

Sole Makers of B. W. Thurston's Combined Condensing, Scrubbing, and Washing Apparatus,

AND PATENTEES OF THE IMPROVED COMBINED CONDENSING AND PURIFYING APPARATUS SO EMINENTLY ADAPTED FOR EXPORTATION.

REFERENCES TO UPWARDS OF 300 GAS-WORKS.

DANIEL HOWARD,

Successor to the late BENJAMIN WHITEHOUSE,

(ESTABLISHED IN 1765,)

BOILER AND GASHOLDER WORKS

Westbromwich, near Birmingham.

MANUFACTURER OF TELESCOPE AND SINGLE GASHOLDERS,

WROUGHT & CAST IRON TANKS

FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS,

And all kinds of GAS APPARATUS.

Wrought-Iron Roofs, Bridges, and Girders; Steam, Hot Water, and Range Boilers; Tanks, Cisterns, &c.,

And all kinds of Wrought-Iron Work.

DRAWINGS, SPECIFICATIONS, and ESTIMATES FURNISHED.

HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES

TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

100, HATTON GARDEN, LONDON.

Drawings and Prices upon application.

LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS,

BY

Spence's Patent Dry Copperas,

The only Purifying Material which removes, by one process, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of four years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION.

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,

VICTORIA CHEMICAL WORKS, ASHTON NEW ROAD, BRADFORD, MANCHESTER,

Manufacturers of SPENCE'S PATENT DRY COPPERAS; GREEN COPPERAS;

SPENCE'S PATENT GAS DEODORIZER;

SULPHATE OF AMMONIA, GREY AND BROWN; SULPHURIC ACID; MUDIE'S DISINFECTANT, &c.

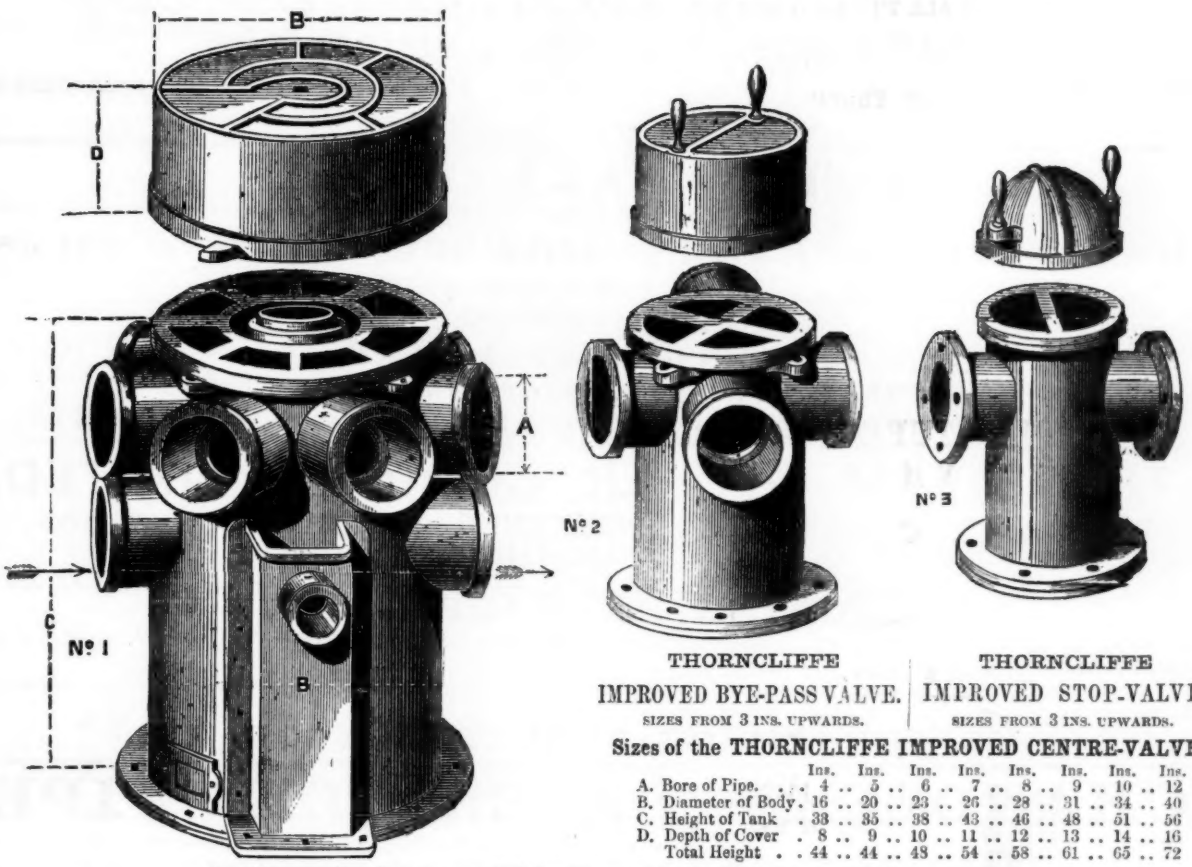
CONTRACTORS FOR THE PURCHASE OF SPENT OXIDE.

ALL COMMUNICATIONS TO BE ADDRESSED TO THE WORKS.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.



THORNCLIFFE IMPROVED BYE-PASS VALVE. SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

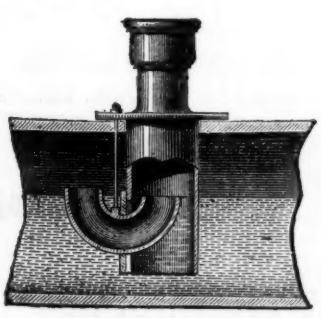
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



Messrs. N. C. & Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING DIP-PIPES.

These Patent Self-Acting Dip-Pipes are rapidly coming into general use by gas companies. By their use the whole of the pressure caused by the old kind of Dip-Pipes is entirely removed, therefore the yield of gas per ton of coal is considerably increased. They also act as a perfect safeguard against the deposit of carbon (or scurf) inside the retorts.

A saving of fuel is effected, and the wear and tear to the retorts greatly diminished.

They are also perfectly Self-Acting, they being regulated solely by the gas. They cannot get out of repair, and when once fixed, will last as long as the old kind, and can be easily adjusted should the hydraulic main sink; they can also be worked with advantage where there is no exhauster.

Testimonials can be had from Herbert Unwin, Esq., engineer of the Sheffield United Gaslight Company and the Penistone Gas Company. At both these companies works they have been in constant operation for several months. Further testimonials can be had on application to the Patentee, J. G. Hawkins, Effingham Street Gas-Works, Sheffield.

For Prices, &c., apply to

Messrs. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, near SHEFFIELD.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

And all kinds of Experimental Gas Apparatus.

JOHN HALL & CO.

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

THE STEAM STOKER COMPANY, LIMITED,

ARE NOW PREPARED TO GRANT

LICENCES FOR THE USE OF THEIR VARIOUS PATENTS

FOR

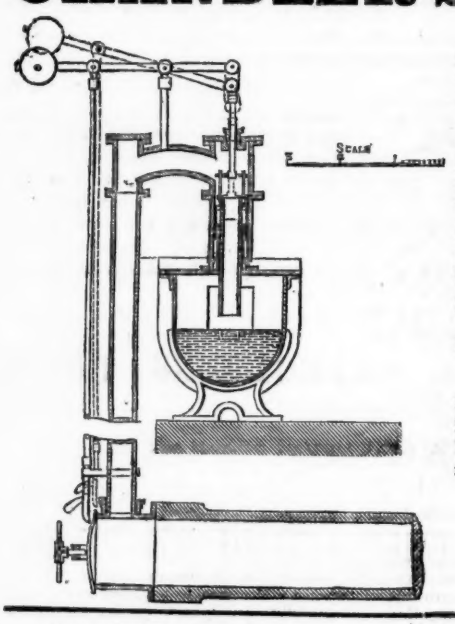
STOKING BY MACHINERY.

Under one or the other of their Patents, Machines can be adapted to almost any existing works without material alteration of the Retort-Houses or Settings.

Applications, accompanied by full particulars as to dimensions of the Retort-Houses, Settings of the Retorts, &c., &c., should be addressed to the Secretary, at the Offices of the Company,

155, FENCHURCH STREET, LONDON, E.C.

CHANDLER'S PATENT DIP-PIPE.



It is well known by all Gas Managers that back pressure upon the retorts greatly retards the production of gas, causing a deposit of carbon which keeps steadily accumulating. Such carbon reduces the capacity of the retorts, requires extra fuel for heating, and has to be frequently removed by heavy iron bars, which very much injure the retorts. By the use of Chandler's Patent Dip all these evils are entirely remedied. When the retorts are being drawn and charged, the Dip-Pipe is sealed in the fluid of the hydraulic main. As soon as the lids are replaced, the Dip is raised completely out of the fluid, and the gas passes unrestricted to the holders. By running the exhauster to a level gauge, ALL PRESSURE IS REMOVED FROM THE RETORTS. The consequence is that there is no deposit of carbon, no need of scurfing, no extra fuel is required, a large saving of wear and tear and loss of time is effected, and a greatly increased production of gas per ton of coal is realized.

The following testimonial letter has been received from the manager of the Erith Gas-Works:—

Messrs. Chandler and Sons.

Gentlemen,—I beg to inform you that during last week I carbonized 18 tons 5 cwt. of Ravensworth Pelaw Coal in a single setting of retorts fitted with your Patent Dip-Pipes, and obtained a yield of 195,800 feet of gas, equal to 10,730 feet per ton, which is a considerably greater yield than I have been able to obtain before using your Dip. The single retort fitted with your Patent Dip, which has now been in use here upwards of four months, has been throughout, and is now, quite free from carbon.

I am, gentlemen, &c.,

Erith Gas-Works, Aug. 2, 1873. (Signed) D. Vincent, Manager.

For terms of use and cost, apply only to the Patentees,

Messrs. CHANDLER & SONS, ENGINEERS AND CONTRACTORS,

YORK STREET, LONDON ROAD, SOUTHWARK, LONDON, S.E.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, Westminster.

THOMAS PROUD,

Brookfield Works,

103, ICKNIELD STREET EAST, BIRMINGHAM,

MANUFACTURER OF

WOOD GRIDS

FOR PURIFIERS AND SCRUBBERS,

AND

CONTRACTOR FOR GAS APPARATUS & MAIN-LAYING.

TANGYE BROTHERS & HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

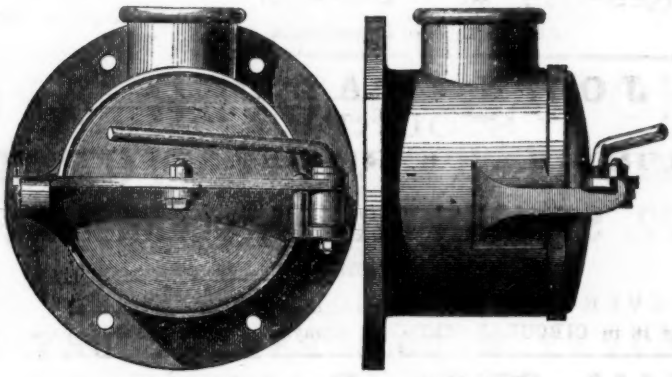
HOLMAN'S PATENT ECCENTRIC FASTENINGS.

OVER 7000 IN USE.

NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW. SIDE VIEW.

SIMPLE.

ECONOMICAL.

DURABLE

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

THESE LIDS ARE ADOPTED BY THE FOLLOWING (AMONG MANY OTHER) GAS COMPANIES:—

The Gaslight Company, Beckton (where over 2000 are in use).
„ Gaslight Company, Bow Common.
„ London Gaslight Company.
„ Independent Gaslight Company.
„ Phœnix Gaslight Company.
„ South Metropolitan Gaslight Company.
„ West Ham Gas Company.
„ Imperial Gaslight Company.

The Gas-Works, Royal Arsenal, Woolwich.
„ Alliance and Dublin Gas-Works.
„ Edinburgh Gas-Works.
„ Manchester Corporation Gas-Works.
„ Salford Corporation Gas-Works.
„ Rochdale Corporation Gas-Works.
„ Liverpool United Gas-Works.
„ Birkenhead Gas-Works.
„ Birmingham Gas-Works.

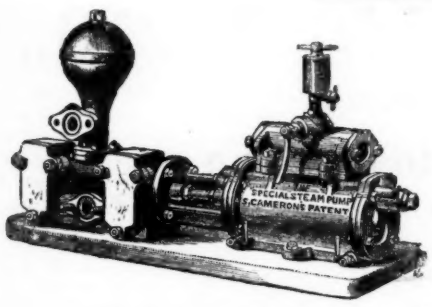
The Nottingham Gas-Works.
„ Newcastle-on-Tyne Gas-Works.
„ Carmarthen Gas-Works.
„ Merthyr Tydfil Gas-Works.
„ Ystrad Gas-Works.
„ St. Alban's Gas-Works.
„ Over Darwen Gas-Works.
„ Aylesbury Gas-Works.
„ Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial, among others, has been given:—

The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov. 14, 1871.

Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) F. J. EVANS.



THE "SPECIAL" STEAM PUMP

REQUIRES NO SHAFTING, GEARING, RIGGERS, OR BELTS.

DELIVERS A CONSTANT STREAM.

OCCUPIES VERY LITTLE SPACE.

CAN BE PLACED CLOSE TO ITS WORK, AT ANY DISTANCE FROM THE BOILER,

Thus avoiding Lengths of Shafting or Long Suction and Return Pipes.

SUPPLIED TO THE FOLLOWING GAS-WORKS

FOR PUMPING EITHER WATER, AMMONIACAL LIQUOR, OR TAR.

The Gas Co., Horseferry Rd.	1	Bolton	2	Dewsbury and Batley	1	Londonderry	1	Rochdale	1
„ Equitable Gas Co.	1	Boston	1	Doncaster	1	Louth	1	Rotherham	1
„ Imperial „	6	Bradford	1	Dunstable	1	Maidstone	1	Salford	6
„ London „	1	Brentford	1	Eastbourne	1	Middlesborough	2	St. Alban's	1
„ Phœnix „	6	Brighton	1	Falmouth	1	Newcastle and Gateshead	1	St. Helen's	2
„ South Metropolitan	1	Bristol	2	Forfar	1	Northampton	2	Shipley	1
„ Western „	1	British Gas, Hull	1	Guernsey	1	Ogley Hay and Brownhills	1	Southport	2
„ Alliance & Dublin Consrs.	9	„ Norwich	1	Henley-on-Thames	1	Oxford	1	Stockton	1
Aldershot	1	Burnley	2	Ipswich	3	Plymouth	1	Sutton Southcote & Drypool	2
Altona	1	Burslem and Tunstall	1	Jersey	1	Portsea Island	2	Sutton	1
Arbroath	1	Bury St. Edmund's	1	Kingston-on-Hull	2	Preston	1	Tottenham and Edmonton	1
Aylesbury	3	Cagliari	1	Kingston-on-Thames	3	Reading	2	Tunbridge	1
Banbury	1	Cork	1	Leeds	1	Richmond	6	Tynemouth	1
Barnet	1	Darlington	2	Lewes	3	Rio de Janerio	1	Wandsworth	1
Belfast	2							Windsor	1

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

TRAVELLERS AND HYDRAULIC LIFTS FOR PURIFIER-LIDS, &c.

CLELAND'S PATENT DIRECT STEAM-JET EXHAUSTERS.

TANGYE'S PRIZE MEDAL STEAM-ENGINES.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF

PATENT WET & DRY METERS,

STATION-METERS AND GOVERNORS,

PRESSURE REGISTERS, GAUGES,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

CONTENTS.

Circular to Gas Companies:—
Gas Bills for the Next Session . . . 1077
The Notice of the Chartered Company for Revision of Price . . . 1077
The Notice of the Imperial Company for Revision of Price . . . 1077
The Purchase of the Metropolitan Gas Companies . . . 1077
Discontent among Consumers in Glasgow and Manchester . . . 1078
Average Meter System for Paddington . . . 1078
Election of Mr. Drimmle as Director of the Dublin and Alliance Gas Company 1078
Mr. Warner's Forms for Registration of Distributory Plant . . . 1078
Mr. Warner on the Advantages of Coke for Domestic Purposes . . . 1078
MM. Pelouze and Audouin on the Rival Inventions . . . 1078
Leading Article:—
Water Legislation in 1873 . . . 1078
Dr. Letheby on the Right Use of Disinfectants . . . 1079
Correspondence:—
Leakage of Gas . . . 1080
Skoines's Patent Gas . . . 1081
Gas Purification in London . . . 1082
Automatic Lamp Lighting . . . 1082
Parliamentary Intelligence:—
Notices given for Private Bills (Session 1874) relating to the Supply of Gas and Water, &c. . . . 1082
Notices of Applications to the Board of Trade (Session 1874) under the Gas and Water Facilities Act, 1870 . . . 1083
Legal Intelligence:—
Vice-Chancellors Courts—
The Wilts and Berks Canal Navigation Company, Limited, *v.* The Swindon Water-Works Company, Limited . . . 1084
The Attorney-General and Others *v.* The Corporation of Barnsley . . . 1084
Irish Court of Common Pleas—Farquharson *v.* Alliance and Dublin Gas Company 1085
Dublin Southern Division Police Court—Charge of Embezzlement from the Alliance and Dublin Gas Company . . . 1085
Miscellaneous News:—
Gas Explosion at Halifax . . . 1089
Gas and Water Works Facilities Act, 1870, Amendment Act, 1873—
Glasgow (Corporation) Gas . . . 1085
Metropolis Gas Supply . . . 1085
Metropolis Water Supply . . . 1089
Manchester (Corporation) Gas Supply . . . 1089
Glasgow (Corporation) Gas Supply . . . 1090
Belfast Town Council—Proposed Purchase of the Gas-Works . . . 1090
On Carburation. By Wm. H. Wahl, Ph.D. . . . 1091
Institution of Civil Engineers . . . 1092
Appointment of Meter Inspector to the Corporation of Dublin . . . 1092
Alliance and Dublin Consumers Gas Company . . . 1092
Nictheroy (Brazil) Gas Company, Limited . . . 1092
Advances in the Price of Gas . . . 1092
Bury (Lancashire) Gas Supply . . . 1092
Dublin (Corporation) Water-Works . . . 1092
Hereford (Corporation) Gas Supply . . . 1092
Hull Gas Supply . . . 1092
Salford (Corporation) Gas Supply . . . 1092
Sunday Labour in Gas-Works . . . 1092
Suffocation by Gas at Bristol . . . 1092
Birmingham Water Supply . . . 1092
Glasgow Water Supply . . . 1092
Hull (Corporation) Water Supply . . . 1092
Machinery at the Cattle Show . . . 1092
Register of New Patents:—
Patison, J.—Production of Illuminating Gas . . . 1092
Henderson, A. C.—Purification of Water . . . 1093
Campbell, M.—Preparing Peat for Fuel . . . 1093
Bolton and Webber—Obtaining Photometric Measurements . . . 1093
Chappell, T.—Manufacture of Gas . . . 1093
Hoey, T.—Preventing Waste of Water . . . 1093
Glover, J.—Dry Gas-Meters . . . 1093
Applications for Letters Patent . . . 1093
Grants of Provisional Protection . . . 1093
Inventions protected for Six Months . . . 1094
Notices to Proceed . . . 1094
Patents which have passed the Great Seal . . . 1094
Patents which have become void . . . 1094

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

TOBIAS.—*There is no general Act giving local authorities the power either to start or to acquire gas undertakings; but provisions have been inserted in several local Acts giving such powers. Having a special Act does not endow a company with the complete monopoly of a district; but, as a rule, unless grave delinquency is proved against a company, Parliament refuses to sanction a rival undertaking.*

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 16, 1873.

Circular to Gas Companies.

THE list of Bills relating to gas companies to be presented to Parliament in the next session, and also of the Provisional Orders applied for under the Gas and Water Works Facilities Act, which we publish to-day, offers some noticeable features for comment. In the first place, we may remark that only four Bills are promoted for the incorporation of companies hitherto without statutory powers. On the other hand, application is made to the Board of Trade for thirteen Provisional Orders, which, if granted and confirmed by a general enactment, will confer on the companies many of the powers to be acquired by a special Act. The most important difference between a special Act and a Provisional Order is that the latter leaves the company unincorporated, and with all the legal disadvantages belonging to that state of existence. For undertakings of any magnitude, or in any cases in which opposition from local authorities, or even from individuals, is experienced, or is to be expected, we have no hesitation in saying that a special Act is desirable. The cost, if unopposed, is not ruinous; and, on the other hand, the cost of a Provisional Order, if opposed by petition to either House of Parliament against confirmation, will be as heavy as in the case of an opposed Bill. To small country companies the little expense of a Provisional Order may act as a temptation to indulge in the luxury of statutory powers, but, in our opinion, such companies, if they can get along comfortably with their customers and neighbours, are in a much better position without these powers, which are in many cases dearly bought, considering the obligations and restrictions that inevitably accompany them. It is possible that the uncertain duration of the present Parliament has induced some companies to refrain from promoting Bills, or it may be that for the moment Provisional Orders are preferred to special Acts.

Another noticeable thing is the fact that there are eight Bills, which if carried will authorize the purchase of gas undertakings by local authorities. We include among them the bogus Bill to empower the Corporation of the City of London and the Metropolitan Board of Works to effect a compulsory purchase of the metropolis gas companies—a Bill which is not likely to advance beyond the present stage, but of which we shall have more to say below. There is besides the Bill of the Dublin Corporation, who seek to take advantage of the present depressed circumstances of the Alliance Company in order to effect what can only be called the confiscation of their property. There is also the Bill of the Nottingham Corporation, who, not having one word of complaint to utter against the companies they are endeavouring to absorb, are still anxious to wrest from the shareholders undertakings which, if profitable to the owners, are no less useful to the community. We have no expectation that the attempt will be successful, but, if it be, of this we are certain—that the inhabitants of Nottingham will be no better off under the Corporation than under the companies. The Bills of the Belfast and Neath Corporations will, we have no doubt, pass into laws, if the companies and the Corporations have agreed upon the terms of purchase. In the case of Belfast it would appear that the terms have been settled at 22½ years purchase of the statutory profits, a price which may be considered satisfactory. After next year Belfast will probably be relieved of the presence of the "foreigners," whose irruption there, as elsewhere in Ireland, is to be attributed solely to the want of commercial enterprise in the Irish people themselves. We have not yet learned the terms of the Neath purchase, but seeing the good understanding established by the Act of last session, there would appear no reason to doubt that they will be satisfactory. We shall have occasion to notice the Bills more particularly when they are printed, and the actual terms disclosed. Beyond the severe contests which may be expected on the Dublin and Nottingham Bills, the course of legislation on gas matters in the coming session will probably be uneventful. No general legislation is to be expected, for although, as we have pointed out before, if the high price of coal continue, a new Gas and Water Works Facilities Act Amendment Act must be passed, the question is not likely to occupy the attention of an expiring Parliament.

The renewed notice of the Chartered Company, and the announcement of the intention of the Imperial Company to apply for a revision of price have set the metropolitan vestries in a sort of ferment. As regards the former, a general impression seems to prevail, which we believe to be erroneous. It is supposed that the Chartered Company intend to apply for an increase beyond the price fixed for this year. We are not in the secrets of the company, and have no knowledge of the terms of the application they intend to make; but we shall be very much surprised to learn that they ask for more than the advance granted by the commissioners this year. The writers and speakers who have expended their eloquence on the subject appear to have overlooked the fact that the increase granted by the Board of Trade, under the provisions of the City of London and Chartered Gas Acts, 1868, is for the year only, and that if the application be not renewed the price falls to the maximum of those Acts. It is to prevent this reversion that the company renew their application; and unless they can show to the satisfaction of a new commission that this year's price will not enable them to pay 10 per cent. next year, the price cannot be advanced beyond the present amount. The Metropolitan Board and the Corporation of London are both in a belligerent mood, and intend to oppose the application of both companies. We are afraid the opposition will have no good results. The words of the Acts are imperative. The Chartered may be the worst managed company in the metropolis, but if the management were ten times worse than it is alleged to be, the Commissioners would still be bound to give the company a price calculated to yield, as near as may be, 10 per cent. The words of the Imperial Company's Act are the same, and whatever opposition may be made, some advance in price in their case also is inevitable.

Naturally enough the agitation on these matters revives that for the purchase of the companies by the Metropolitan Board and the Corporation of the City of London, and notice has been given of the Bill, alluded to above. We might dismiss this matter at once, with the remark that Parliament is never likely to entertain the question of this purchase until a scheme for the municipal government of the whole metropolis has been devised and made law. After that the gas companies may look out for themselves; at present they are safe. But pending the inauguration of this much desired municipal reform, it may be worth while to look forward and count the possible cost of taking over the companies. Before the end of next year the capital of the companies will amount in round numbers to £10,000,000. With some inconsiderable exceptions, this capital is entitled to, and has been receiving, a 10 per cent. profit. The lowest value of the undertakings would therefore be 15 millions. The Metropolitan Board, we may suppose, who are now about, if Parliament will allow them, to embark on a grand financing career, would no doubt be able to raise the sum required at 3½ per cent.; so much profit, then, must be made. After that will come sums to be set apart for contingency, depreciation, and renewal funds, and these only to make the undertakings self-supporting. But here in London, as elsewhere, the gas-works are coveted as a

means of dispensing with rates. Well, supposing the London undertakings, in the hands of the Metropolitan Board, managed, on Sir Joseph Heron's principle, to yield "a reasonable profit" of 10 per cent., what will be the result? Why, that the London consumers will have to pay 10 per cent. on 15 millions instead of 10 millions. We fail to see what the consumers who now make an outcry will gain by that. Managed on the self-supporting principle which we advocate, we are satisfied that the consumers would gain nothing by the change, but managed on the Manchester "reasonable-profit" system they cannot fail to be losers. We put the matter hastily and broadly before our readers to-day, but should the agitation gain ground we shall be prepared to go more minutely into the question. We may repeat, however, that the question at issue is simply this: Are the gas consumers of the metropolis content to pay 10 per cent. on 10 millions, or would they prefer to pay from 6 to 10 per cent. on 15 millions? We do not pause for a reply.

It is impossible for us to notice all the wild speeches made at vestry meetings, of which we are nevertheless compelled to give our readers a short report. They only serve to show the ignorance prevalent among the members who presume to offer opinions on the subject. If, however, it should be supposed that consumers and ratepayers in places with gas undertakings under corporate management are perfectly content, we may speedily dispel the illusion. In Glasgow, a place often quoted, the complaints are loud, if not furious. With gas of much the same quality as at Manchester, but at a much higher price (4s. 7d.), the undertaking has been carried on during the past year at a loss of £11,744, and the consumers have stoutly but unsuccessfully resisted any advance in price. The Corporation have just obtained a Provisional Order enabling them to raise the price to 6s., and have fixed the actual price from the 1st inst. at 5s. 5d. In Manchester an advance has been made in spite of urgent remonstrances from consumers impatient of additional taxation. Altogether it is a trying time for both corporations and companies, and we must admire the courage—or ought we not rather to deprecate the rashness of the men who would assume the responsibilities of such a vast undertaking as one gas supply for this huge metropolis?

The Paddington Vestry have at last resolved on adopting the average meter indication system for their public lamps, and at the same time undertaking the lighting, extinguishing, &c., when their existing contract with the Imperial Company comes to an end. The particular system to be put in use is, we believe, similar to that in use at Nottingham. We feel confident that the results will prove satisfactory to both the company and vestry. The former will be relieved from much responsibility, and the latter, we have no doubt, will effect a considerable saving in money, not to mention the peace of mind the new arrangement will bring to both parties. We hope the example of the Paddington Vestry will be followed by other local authorities in the metropolis.

The shareholders in the Dublin and Alliance Gas Company may be congratulated on the election of Mr. Drimmie to the Board of direction of the company. As the most prominent member of the committee of shareholders whose action resulted in the reconstitution of the Board, Mr. Drimmie has already rendered good service to the shareholders, whose interests he will now be in a better position to protect.

Mr. Warner, of South Shields, has forwarded to us a set of printed forms for the registration of distributory plant. Our readers will remember the paper read by Mr. Warner at the last meeting of the British Association of Gas Managers, in which he argued the importance to a gas company of having an accurate register or inventory of such plant. As regards these forms, we need only say that if filled up according to instructions they will show in the clearest and most concise way all details respecting mains, syphons, valves, services, lamps, meters, &c., and we strongly recommend their use.

Mr. Warner has also published a tract, "On the Advantages of "Gas Coke for Domestic Purposes." Anything calculated to promote a steady and constant demand for coke deserves the support of gas companies, who suffer more than the public imagine from the uncertain demand and consequent fluctuating price. Manufacturers know the value of coke as fuel, but they know also that it *must* be sold, a fact which to some extent places the gas company at the mercy of the large purchaser. If a demand for domestic consumption could be created, it would be a great gain to companies. The truth, however, must be admitted; coke is not a pleasant fuel in an open grate, and it will take a long coal famine to persuade English people to adopt close stoves.

We have received a polite communication from MM. Pelouze and Audouin, in reply to the observations we have made on the anticipation of their apparatus in the inventions of M. Alleau and M. Colladon. As we had not the details of these two latter inventions before us, we were careful to say that, while the principle on which the inventions are based appeared to us identical in all three, the advantage in point of compactness rested with the apparatus of MM. Pelouze and Audouin. These gentlemen deny that there is any resemblance between the invention of M. Alleau and their own. We are bound to say, however, that the description they give of M. Alleau's apparatus, and the accompanying drawing, seem to us to confirm the truth of our statement. The apparatus employed by M. Alleau in some small works, with a daily make of 70,000 cubic feet, consisted of seven iron plates three-eighths of an inch thick, each pierced with 40 triangular holes arranged $2\frac{5}{8}$ inches apart in a vertical column, so that the holes in one plate corresponded with a solid surface in the next. The column was 29 inches high, and 16 inches square. There is here certainly a strong resemblance to the condenser of MM. Pelouze and Audouin. As regards compactness, however, these gentlemen calculate that if an apparatus of the dimensions given above is required for a daily make of 70,000 feet, a daily production of 7 million feet would necessitate the use of an apparatus occupying 455 cubic feet, while their own, for the same quantity of gas, is in the space of a very few cubic feet. The reply to the reclamation of M. Colladon is more complete. There is certainly a great dissimilarity in the construction of this gentleman's "mechanical washer" and the condenser the originality of which is disputed; but, after all, the same idea—viz., the condensation of liquefiable matters held in suspension in gas by striking against solid surfaces—seems to lie at the bottom of the invention. The apparatus of MM. Pelouze and Audouin is so far different from the two above named, and its unquestionable superiority is so apparent, that they may be content to allow the small claims of rival inventors. On one point we are glad to be reassured. Our correspondents affirm that the more volatile hydrocarbons which contribute to the illuminating power of gas are not condensed in their apparatus.

WATER LEGISLATION IN 1873.

THE *Ayr Burgh Act* authorizes the Corporation to purchase the undertaking of the Ayr Water Company, the consideration being $5\frac{1}{2}$ per cent. annuities on the share capital of £35,000. The company are to pay over their contingent or reserved fund to the Corporation, less some expenses agreed upon. An annuitant, by giving 12 months notice, may require the Corporation to redeem his annuity, in which case the Corporation will pay 20 years purchase. The Corporation also may give 12 months notice of their intention to redeem, and in that case are to pay 24 years purchase. The Act makes common provisions for the prevention of waste, and fixes the rates, which vary from 8s. for a dwelling-house of less yearly value than £5 to a rate of 5 per cent. on houses the yearly rent of which is £120 or upwards. The Corporation may supply ships at the rate of 2s. for each ton of water. To secure the annuitants of the Corporation, a guarantee-rate may be levied, which is not limited in amount. The Corporation have power to borrow any sum of money required to pay off the mortgages of the water company and to redeem annuities, and also a further sum of £10,000 for the purposes of the water undertaking. Any surplus profits are to be applied so as to facilitate the reduction of the domestic water-rate.

The *Barrow-in-Furness Corporation Act* authorizes the Corporation to borrow £28,000, to construct additional water-works, which must be completed within seven years. The Act authorizes the Corporation to supply fittings, which are to be exempt from distress and execution until paid for. It also gives some further powers for the prevention of waste.

The *Bradford Improvement Act*, among other things, gives the Corporation power to construct an additional reservoir, and also extends the water limits so as to include the township of Bingley and some adjacent hamlets. The Act gives the Corporation power to borrow £200,000 for the purposes of the water-works. [The title of the Act makes no reference to the gas undertaking, so we mention here a matter passed over in our summary of the gas legislation. The Corporation have power by this Act to borrow a further sum of £50,000 for gas-works purposes. The Act extends the municipal limits of Bradford, so as to include the township of Bolton, henceforward to be a ward of the borough of Bradford. Bolton has hitherto been supplied with gas partly by the Eccleshill and Bolton Gas Company, and partly by the Shipley Gaslight Company. The Corporation are now to purchase the mains and pipes of these two companies lying within the township, at a price agreed upon or fixed by Mr. T. Hawksley, as sole arbitrator. The Act prescribes the pressure at which gas is to be supplied—viz., 6-10ths and 8-10ths within the usual hours, and fixes the illuminating power at 15 candles, the burner being a 15-hole Argand, with 7-inch chimney.]

The *Burly Local Board Water-Works Act* authorizes the Board to purchase the private undertaking of Mrs. S. Crofton, and construct additional works to collect water from various streams and springs within the district of the Board. The water-rates are those usually fixed. It is provided that the Board shall not supply water for other than domestic purposes, if such supply should interfere with giving a full and sufficient supply for domestic purposes. Full powers are given to prevent waste and contamination. The Board may borrow £10,000 for water purposes.

The *Buxton Local Board Act* authorizes the Local Board to enlarge a reservoir and construct works, to be completed within seven years. The rates for a supply for domestic purposes are not to exceed $6\frac{1}{2}$ per cent. on houses the rateable value of which does not exceed £20, or 6 per cent. for houses of higher value. The Board are not obliged to supply any house for less than 2d. a week. A domestic supply is to include water for one closet, not water for baths, for washing carriages, or for horses and cattle. Every additional closet is to be charged 5s. a year, and each bath 10s. Full powers are given for the prevention of waste. The Board are authorized to borrow £15,000 in respect of the water-works, which is to be paid off within 50 years, by means of a sinking-fund, commenced after the expiration of five years from the passing of the Act.

The *Chichester Water-Works Act* is the No. 1 Bill passed into a law. It incorporates a company, with a capital of £20,000, in £10 shares, for the purpose of supplying the city of Chichester and some neighbouring parishes with water, taken from springs in the parish of Bosham. There is nothing unusual in provisions or rates granted.

The *Colne Valley Water Act* incorporates a company with a capital of £100,000, and £50,000 additional if necessary, for the purposes of supplying with water an extensive district in the counties of Middlesex and Herts. The water is to be obtained from a well in the parish of Bushey. The dividend on the additional capital is limited to 7 per cent. Borrowing power to the extent of £25,000 is granted,

but it cannot be exercised until the whole capital of £100,000 has been issued, and if the additional capital of £50,000 be raised, one-fourth of that sum may be borrowed under the usual restrictions. The rights of the Harrow Water Company, and of the private undertaking of Mr. Robinson, at Boreham Wood, are fully protected. A schedule of regulations to be observed by consumers requires a stop-tap on the service-pipe to all premises, prescribes the weight of the lead services, compels the use of screw-down taps which will resist a pressure of 300 lbs. to the inch, makes obligatory the use of waste-preventers, and the conversion of overflow into warning pipes; and, in fact, embodies most of the regulations sanctioned by the Board of Trade for the metropolitan companies in the event of their giving a constant supply. Beyond this there is nothing unusual in the provisions of the Act.

The *Derby Water-Works Act* extends the limits of supply of the Derby Water-Works Company, and authorizes the construction of additional reservoirs and works. The company may raise further capital to the amount of £80,000, and may borrow £2500 in respect of every £10,000 as the capital is issued.

The *Doncaster Corporation Water-Works Act* empowers the Corporation to make additional reservoirs and works. As the additional water abstracted from the river Don will interfere with the navigation of that river, compensation is to be made either in money or water to the railway company holding the navigation rights. Compensation is also to be made to other persons. The amount of water which may be taken from the reservoirs in one day is restricted to 750,000 gallons. The supply need not be constant nor under pressure. Power is given to borrow £85,000 for the purposes of the Act, to be paid off by means of a sinking-fund in thirty years.

The *Glasgow Corporation Water-Works Amendment Act* extends the time fixed by the Act of 1866 for the execution of certain works, and allows the Corporation to abandon a portion of the scheme sanctioned by that Act. It further confers a few general powers, and permits the commissioners to apply their reserve-fund to the redemption of annuities and mortgages.

The *Grand Junction Water-Works Act* merely empowers the Grand Junction Water-Works Company to acquire additional land at Hampton, protecting at the same time the rights of the Conservators of the Thames.

The *Grantham Water-Works Act* incorporates the Grantham Water-Works Company with statutory powers for the supply of water to Grantham and adjacent places in the county of Lincoln. It further gives powers to extend the works of the old company by appropriating the Stoke River and water from several wells. The capital of the old company was £25,000, in £10 shares, and the incorporated company have power to raise additional to the amount of £15,000 in shares or stock, with the usual borrowing powers on old and new capital. There is nothing in the rates or provisions of the Act calling for notice.

The *Mid-Lothian Water Act* incorporates a company and empowers them to construct extensive works for the supply of parishes and places in the county of Edinburgh. The source is the river called the Manor Water, and the tributaries thereof, from which the company may take five millions of gallons a day. Measuring gauges are to be provided by the company, which are to be open to inspection of the neighbouring landowners, whose water rights are protected by the Act. There is nothing in the provisions which calls for special notice, and there are two bills announced for presentation in the next session, which, if passed, may modify the limits and plans. The capital of the company incorporated is to be £250,000, in £10 shares, and power is given to borrow £80,000 when the whole of the capital has been issued.

The *Over Darwen Local Board, Water-Works and Gas-Works, Act* empowers the Board to purchase the undertaking of the Darwen Water-Works Company, who are dissolved, and ceased to exist at the passing of this Act. The consideration is a perpetual annuity of £1 8s. in respect of each £20 share in the company. The annuities may be redeemed, by means of a sinking-fund, at 20 years purchase. This Act incorporates the Darwen Water-Works Act, 1869, and contains no special provisions as respecting rates of supply, &c.

The *Pontypool Gas and Water Act*, so far as it relates to the water undertaking of the incorporated company, authorizes, or rather compels, the enlargement of the existing reservoir, so that it shall be capable of holding not less than 4½ millions of gallons. The water is to be effectively filtered before delivery. Complaints of quantity or quality made by fifteen ratepayers to the company are to be investigated by a competent person appointed by two justices, who may order the company to remedy the causes of complaint within a reasonable time, and in default impose a fine of £10. A domestic supply under this Act is not to include a supply for horses and washing carriages which are kept for hire, and in other respects is strictly limited to water for purely domestic purposes. Water-closets more than one may be charged 5s. a year, and every bath 12s. The rates are from 8 per cent. on the annual value of houses, when such value does not exceed £10, to 5 per cent. when the annual value exceeds £30. Shops and warehouses are to be rated on three-fourths or two-thirds of the value, according as they are under or over £50 of annual value. Moderate powers for the prevention of waste are conferred.

The *Portsmouth Borough Water-Works Act* enables the Portsmouth Water-Works Company to make and enforce regulations for the prevention of waste, &c., such regulations to be approved by the Corporation. The supply at Portsmouth is constant, and for two hours on every day pressure is maintained so that the water may reach the top storey of the highest houses. This Act provides that highest houses shall mean the highest in existence at the passing of this Act. Stringent powers of inspection are conferred. The highest penalty for non-compliance with regulations is £5.

The *Sheffield Water-Works Act* merely extends the time fixed by the Sheffield Water-Works Act, 1867, for the execution of certain works.

The *Swansea Water-Works Act*, authorizes the Corporation of Swansea, acting as urban sanitary authority for the district, to complete and improve the works authorized by the Swansea Local Board Water-Works Act, 1860, and to borrow £80,000 for the purpose, which sum is to be paid off by a sinking-fund. The works authorized are a new reservoir, and the reconstruction or repair of the embankment at the end of the present reservoir.

The *Trowbridge Water Act* incorporates the Trowbridge and District New Water Company with statutory powers for the supply of water to Trowbridge, and adjacent places. The capital of the original undertaking was £7860, and the incorporated company have power to raise it to £40,000, with borrowing power to the usual amount. The water is taken from the Biss and Semington Brooks, and for that taken from the latter the company are to pay at the rate of £20 per annum for every 100,000 gallons taken per diem. Compensation water is to be provided for the owners of certain works. The company take power to make regulations for the prevention of waste, &c. The rates and other provisions of the Act are of the usual nature.

The *Wakefield Water-Works Act* authorizes the Wakefield Water-Works Company to make a new service reservoir in the township of Stanley-cum-Wrenthorpe. The site is on the top of the hill, and, as it may be necessary to raise the level in order to supply certain parts of Wakefield, special provisions are introduced respecting the strength of the embankments. The water is pumped from the Calder, and this Act provides that all supplied for domestic purposes shall be filtered by Spencer's process, or some other process approved by the Local Government Board. The Act authorizes the company to raise £30,000 additional capital, and confers the usual borrowing powers in respect thereof.

DR. LETHEBY ON THE RIGHT USE OF DISINFECTANTS.

THE present session of the Society of Medical Officers of Health was opened with an address by the president, Dr. Letheby, "On the Right Use of Disinfectants," the object of the paper being "the removal of the many dangerous fallacies which beset the subject, and the arrest, if possible, of the unblushing quackery which disgraces it." The learned doctor commenced by observing:

A glance, indeed, at the so-called sanitary literature of the day, will show how boldly and how confidently the use of certain inert bodies is recommended to the public as powerful disinfectors. The danger of this cannot be overrated, for when by such means undue confidence is placed in the disinfecting power of an agent which fails in its purpose, the result is not merely a waste of materials and a loss of valuable time, but it is also a serious danger to the public. Therefore it is that we should be most careful in the selection of disinfectants—using those only which are known to be effective. It is necessary also that we should be thoroughly conversant with their several modes of action, and that in applying them we should be guided by rational principles suggested by the scientific aspects of the subject.

With this introductory caution, Dr. Letheby proceeded to define the term "disinfection"—viz. "the removal, or neutralization, or destruction of that which is offensive to the senses, or hurtful to the body, limiting it, of course, to those cases where offensive effluvia, or noxious matters, or specific contagia, are the subjects of treatment;" and he remarked in passing that although this question was "undoubtedly connected with the difficult problems now occupying the attention of physiologists, pathologists, and chemists, as to the origin of infusorial life, and the cause of specific infectious maladies, as well as of organic decomposition, yet at the same time it was sufficiently independent of these abstruse inquiries as to be capable of very effective practical treatment," the object aimed at being "the destruction or prevention of the hurtful thing which causes offence or produces disease." As in many cases this is associated with the changes incidental to organic decomposition, the disinfection might be effected in one of four ways:

First, by strengthening the affinities of organic substances, and thus enabling them to resist decay; secondly, by so acting upon them with chemical agents as to produce new compounds which are not susceptible of organization or decay; thirdly, by hurrying on the changes of decomposition and oxidation, so that the particles may quickly arrive at their final stages of decay, and be brought to rest; and, fourthly, by the use of special agents which are found to have specific powers of disinfection.

As an example of the first of these methods of preventing decay, the effect of cold and the desiccation of organic matters was alluded to. As instances of the second, experiments were made to show the coagulation of albuminous matters by alcohol, creosote, the mineral acids, and some of the mineral salts. Under the third head, the president named the oxidizing influences of chlorine, hypochlorous acid, permanganate of potash, and atmospheric air, aided by water and porous substances; and as examples of the fourth method of disinfection he alluded to sulphurous acid, carbolic and cresylic acids, and the volatile oils.

To show the relative values of these several disinfecting substances, the president produced a summary of the experiments made by Dr. J. Dougall, of Glasgow, and Dr. Crace Calvert, as to the action of various antiseptics on protoplasmic and fungus life, and on vaccine lymph. The results had been carefully tabulated by him, and he proceeded to discuss them in the order in which they were placed. We do not intend to follow the learned president through his elaborate paper, but merely to quote a few passages which may interest the general reader.

Under the first head, speaking of the mineral acids (sulphurous, nitric, hydrochloric or muriatic, sulphuric, and chromic acids), Dr. Letheby remarked:

It would seem, therefore, that they are all powerful disinfectants, and this accords with experience; for as far back as the year 1773, Guyton Morveau, one of the most distinguished chemists of France, recommended muriatic acid vapour as a means of disinfecting hospitals; and in 1797, Dr. Carmichael Smith obtained a parliamentary grant of £5000 for the successful use of nitrous fumes in the disinfection of our prisons. But sulphurous acid enjoys a reputation of much more ancient date. Homer tells us that Ulysses, after destroying the suitors, fumigated the rooms in which the bodies lay, as well as the rest of the palace, with the fumes of "pest-averting sulphur." Ovid, too, in the "Fasti," speaks of the cleansing and purifying power of sulphur; and Pliny, in his "Natural History," says "that brimstone is employed ceremoniously in hallowing of houses, for many are of opinion that the perfume and burning thereof will keep out all inchantments—yea, and drive away any foul fiends and evil spirits that do haunt the place." The Chinese have always attached considerable importance to the action of burning sulphur as a disinfectant, and have from time immemorial used pastiles of sulphur for internal fumigation, and squibs and crackers for external.

Of the organic acids (carbolic, cresylic, acetic, picric, and benzoic acids), all are disinfectant and antiseptic, the most powerful, according to Dr. Dougall, being benzoic acid. Speaking of carbolic acid, Dr. Letheby remarked:

Its antiseptic power is evidently great; for, according to Dr. Crace Calvert, the presence of one part of the acid in 1000 of an organic solution will check decomposition and prevent the appearance of vibrio or fungus life for more than 40 days. At the Morgue in Paris, where the acid has been freely used, Dr. Devergie found that in hot summer weather one part of carbolic acid (No. 5, which contains 85 per cent. of carbolic and cresylic acids) in 1900 of water, freely applied to the dead bodies, completely prevented putrefaction; and even when diluted to the extent of one part in 4000 of water the effect was most marked. In my own experiments in the City of London I have noticed that a very small quantity of carbolic acid in the sewers prevented decomposition, and that a solution of 1 per cent. of it upon meat arrested putrefaction.

Of the alkalies (lime, potash, soda, and ammonia), the speaker observed that they were not very powerful disinfectants unless they were used in a somewhat concentrated state. They were then useful for detergent purposes and for the destruction of organic matter:

Cream of lime, for example, as well as a strong solution of potash and soda, may be advantageously employed in cleansing rooms, stables, cattle-sheds, slaughter-houses, &c.; and powdered lime, sprinkled freely about cellars, church vaults, cattle-lairs, &c., will absorb moisture, carbonic acid, &c., and help the oxidation of organic matters. Added to sewage in the proportion of from 10 to 20 grains per gallon, it combines with the carbonic and phosphoric acids, forming a flocculent precipitate which rapidly subsides, and carries with it all suspended matters as well as a notable proportion of soluble organic matter. It likewise kills the infusoria of the sewage, and checks the decomposition of it for several days.

Next in order come the haloids, the most important of which are iodine, chlorine, chloride of lime, chloride of zinc, chloride of aluminum (chloralum), and common salt:

Iodine is not of much practical importance, although it has been recommended for use in the sick chamber. Chlorine, however, is a powerful disinfectant, and has been used with considerable success from the time (1791-92) when Fourcroy, the distinguished French chemist, proposed it as a fumigating agent. Chlorine is a heavy gas, its specific gravity being as nearly as possible two and a half times that of atmospheric air. It is extremely irritating, and, like sulphurous acid, cannot be effectively and safely used in the sick chamber except for sweetening the air, as the quantity necessary to disinfect is irrespirable. The same is the case with chloride of lime, when its acid (hypochlorous) is set free by carbonic or muriatic acid, as it must be to become an effective aërial disinfectant. In proper proportions, however, both of these agents are powerful disinfectants, as they not only check putridity and the development of animalcules in organic solutions, but they also kill such creatures when added in the proportion of about 4 per cent., and they destroy the vitality of vaccine lymph.

Chloride of zinc (Sir William Burnett's fluid) is a liquid which ranges from 1309 to 1594 of specific gravity—the former containing about 30 per cent. of the chloride, and the latter about 54. Its action is evidently due to its power of coagulating albumen, and of absorbing ammonia and sulphuretted hydrogen. Used in the proportion of one part of the chloride to 300 of water it instantly destroys infusorial life, and even when diluted so as to contain but one part in 1000 of an organic liquid it checks decomposition, and prevents the appearance of animalcules and fungi for more than 40 days. Its chief use, however, is as a disinfectant of fœcal matters, for it has no power as an aërial disinfectant, and is too corrosive in its action for textile fabrics.

Mineral sulphates, as the sulphates of zinc, iron, copper, and common alum, &c., are useful disinfectants, when the object is to coagulate albuminous matters and to destroy living organisms, as well as to neutralize offensive miasms, but none of them can be advantageously used as aërial disinfectants, as they are not in any case volatile. Permanganate of potash and chlorozone are both oxidizing agents. They do not appear to exert much action on vital manifestations their use, therefore, in the sick room as disinfectants is altogether fallacious, but the property of permanganate of potash in attacking and oxidizing dead and decaying organic matter gives value to it as a means of purifying potable water. Speaking on this latter point at the close of his address, Dr. Letheby remarked:

The purification of water is ensured by a few drops of permanganate of potash solution (Condy's fluid) or of chlorozone, leaving them to act for a few hours, and taking care that the pink colour is distinctly maintained to the very end of the process. Boiling the water for several minutes, and, after allowing it to cool, filtering it through animal charcoal, is also a safe method of disinfection. The filters of the London and General Water Purifying Company are admirably adapted for this purpose, as they contain a large volume of charcoal, which can be aërated by intermittent filtration. I find, indeed, that water thus filtered is absolutely free from organic taint, looking blue like distilled water when examined in large volume, as in a glass tube two feet in length; and the action of the filter is so enduring that it is maintained in the case of ordinary water for more than a year.

The volatile oils, as camphor, turpentine, &c., were next referred to as being probably effective to some extent, and as having enjoyed for ages a high reputation as trustworthy disinfectants and deodorizers. From these the speaker passed to remark upon charcoal and other porous substances as powerful oxidizing agents:

They owe their action to the property which they possess of condensing upon their surface and within their pores large quantities of vaporous and gaseous matter, which, by the very force of condensation, they bring into contact with atmospheric oxygen, and thus by a process of slow combustion burn up organic miasms almost as thoroughly as if they were passed through the ignited coals of a furnace. In the case of wood charcoal it will absorb about nine times its volume of oxygen, and ninety times its volume of ammonia. The sole condition which is necessary to this is the free access of atmospheric air, which the charcoal uses in oxidizing the putrid miasma. It is useless, therefore, to expect a beneficial action of the charcoal unless it can obtain oxygen, but getting this it will carry on its *cremacausing* power for an indefinite time.

Dr. Letheby proceeded to speak of the purifying power of common earth:

The graveyards of every large city testify to the enormous quantity of organic matter which may be disposed of through its agency; and, looking at the magnitude of the subsoil filth of this city, it is surprising how little it has affected the virgin gravel a few feet below the surface. All this is referable to the catalytic action of the porous soil, whereby the countless tons of decomposing matters have been oxidized and converted into harmless nitrates, which abound in the City wells, and which might, in case of an invasion, furnish our volunteers with abundance of "villanous saltpetre."

Of air and water, as powerful agents of disinfection, the speaker remarked:

They show their beneficial action in the one case in the effect of good ventilation, and in the other in the disintegration of organic substances as they flow along in our polluted rivers, thus giving them the means of rapid self-purification. A heavy storm of rain, too, is a great purifier of the air, and is often the turning-point in the progress of an epidemic; but besides this, water, by reason of its endosmic action, is inimical to the corpuscular structures of many specific contagia, and, by bursting their cell-like envelopes, destroys their vitality.

Disinfection by heat next and lastly claimed attention. The temperature at which infectious matter is rendered inert was discussed, and the employment of heat for disinfecting purposes on all possible occasions was insisted upon.

Having examined the properties and modes of action of the leading disinfectants, Dr. Letheby proceeded to consider the way in which they may be most advantageously applied, taking as examples the common cases which present themselves in actual sanitary practice—1, the disinfection of the sick-chamber and of the articles contained therein; 2, infected clothing and bedding; 3, the treatment of dead bodies; 4, sewage and sewer gases; 5, the offensive gases and infected air of noxious and unwholesome trades; 6, shambles, slaughter-houses, cattle-lairs, &c.; 7, breweries, brewing utensils, and distillers vats; and, lastly, the purification of water.

With reference to the purification of sewage and sewage gases, Dr. Letheby remarked:

The best disinfectants of sewage are the mineral salts, as the salts of iron and alumina in conjunction with lime. Ordinary sewage subjected to the action of from one to two parts of each of these agents per 7000 of sewage is immediately disinfected, the flocculent matters being rapidly precipitated, leaving a clear supernatant water which may be safely distributed upon land, or allowed to flow into a running stream of moderate volume—as from 10 to 12 times that of the defœcated sewage. So effective is this operation that it ought to be universally applied to the sewage of towns when it is not discharged into the sea. The matters of cesspools and privies require the application of large quantities of metallic salts—the best being sulphate of iron (green copperas) or chloride of zinc—either of which should be used of the specific gravity of about 1100.

Sewer gases are easily disinfected by vegetable charcoal in the manner already explained, the charcoal being placed upon trays in boxes which are situated in the course of the ventilating shafts from the sewers or drains. Many years ago I advised the adoption of this plan in the City of London, and there is a large district eastward of Bishopsgate Street, where all the sewer ventilators are fitted with charcoal air-filters. The district is in the filthiest quarter of the city; it contains 1700 houses, occupied by about 14,000 inhabitants, and the total length of the sewers of the district is about 25,587 feet. Along these there are 104 air-shafts fitted with these ventilators, 265 trapped gullies, 15 flushing-tanks, and 26 side entrances. The air-filters consist of an iron box 18 inches deep and 14 inches square, containing a moveable frame of 6 trays or sieves, upon each of which there is a layer of wood charcoal in pieces as large as filberts, about 2 inches deep. Our experiments were commenced in 1860, and they have been maintained with perfect success until the present time, for they are still in action. I have repeatedly submitted the charcoal from the ventilators to chemical examination, and have always found that it contains abundance of nitrate, together with a peculiar alkaline salt of a nitrogenous nature with associated hydrocarbon. These ventilators are best fixed where they are protected from actual wet, as against the sides of houses, or in the course of a shaft or pipe carried up from the soil-pipe of the closet. In such situations their action is continuous for many years, and they should always be thus used where foul gases escape from the soil-pipe, the drain, or the closet of a house. Air-filters of this description have been adopted and applied with more or less success by Mr. Rawlinson, Mr. Baldwin Latham, and Mr. Bazalgette.

Correspondence.

LEAKAGE OF GAS.

SIR,—The letter addressed by Mr. George Anderson to the *Cork Herald* on this subject has been, I perceive, reprinted in your issue of this day. He has thus had the opportunity of explaining his views, first to the general public of Cork, and subsequently to the more select and mostly professional body of readers who see your valuable JOURNAL. That being so, I make free to ask you to give my reply equal publicity.

I hope "the proprietary" referred to by Mr. Anderson will not only observe that his leakage at Cork is nearly 22 per cent., but will also note the very important fact—which he is silent upon—that his make of gas per ton of coal and cannel in 1872 was only 8425 feet, and in 1873 only 8778 feet. (See Mr. Lane's evidence, p. 1048 in the JOURNAL.) I venture to think that nothing I could say would be half so damaging to Mr. Anderson "in the eyes of a proprietary" as these facts in his own practice, and the further fact that he employs his pen in their defence. There are few companies, and fewer engineers, who would be satisfied with such an amount of leakage and so small a production, and fewer still who would be so indiscreet as to publish their failures to the world.

19, *Great George Street, Dec.* 2, 1873. G. W. STEVENSON.

(COPY.)

Sir,—My attention has been directed to a communication from Mr. George Anderson, in the *Herald* of the 18th inst. The propriety of discussing the value of evidence given before the Board of Trade commissioner while the subject matter of inquiry is still *sub judice* is seriously open to question, and I regret that Mr. Anderson should not have restrained his propensity to appear in print until after the commissioner had made his report.

I will not follow Mr. Anderson into the minute questions of differences of

temperature and measurement of gases, nor into a calculation of the number of joints in the main-pipes, which he persists in stating are 60 miles long, although Mr. Denny Lane corrected him on the inquiry by giving the accurate length as 52 miles. I will not even trouble you with a single comment of my own on the evidence given, nor mention a single incident in my own experience; but, with your permission, I will, on this subject of unaccounted-for gas, give you quotations from THE SWORN EVIDENCE of gas engineers in larger practice than Mr. Anderson, and who have the management of larger works than he has ever had charge of.

In 1868 the Brighton and Hove Gas Company applied to Parliament, and were opposed by the Corporation of Brighton. I was examined as a witness for the corporation, besides being engineer for a competing scheme. I estimated the leakage (to use the term which Mr. Anderson calls "vulgar," but which is convenient) of the proposed new works at 10 per cent., and ventured to say the Brighton and Hove Company, whose leakage was then upwards of 14 per cent., might do better. Mr. John Birch Paddon, the skilled engineer to that company, when asked in examination if he thought Brighton could be supplied with only 10 per cent. leakage, said, "Possibly it might, but I have not as yet been able to do it."

Mr. Paddon's company were before Parliament in the last session asking for an increase in the maximum price fixed by their Act of 1868, which was only 3s. 6d., and I had the honour and pleasure of giving evidence along with Mr. Paddon in support of the application. And now for the sworn evidence of Mr. Paddon. On the 16th of June, before a Committee of the House of Lords, he said: "In the year ending 31st December, 1871, we made 218 million feet of gas, and sold 192,687,000, leaving 25 million unaccounted for, or 11·70 per cent. In the year ending 31st December, 1872, we made 228,871,000 feet, and sold 204,321,000, leaving less than 24 million unaccounted for, or 10·49 per cent." This company has 60 miles of mains, and the gas-rental is £625 per mile.

I may add, that the production of gas was 9145 feet per ton of coal, and the quantity brought to book, 8465 feet per ton of 14 sperm candle gas. In other words, this company managed their business so well, that they sold, and got paid for, more gas per ton of coal carbonized than the Cork Company made.

Now take the case of the South Metropolitan Gas Company, whose engineer and manager is Mr. George Thomas Livesey. This company supplies a district on the south side of the Thames, extending far away into the country, seven miles as the crow flies. It includes all the scattered districts of Streatham, Tulse Hill, Dulwich, and part of Norwood, with varying levels of nearly 300 feet. Mr. Livesey was examined on the 10th of April last, before the commissioners appointed by the Board of Trade to inquire into the necessity for a revision of price on the application of The Gaslight and Coke Company. In answer to questions put by counsel (see page 213 of the official report), he says, "We made last year 9700 feet per ton of coal, and sold a trifle over 9000 feet being a difference between the quantity produced and the quantity sold of a little over 7 per cent." He was then asked the proportion of common coal (Newcastle) and cannel used, and his reply is, "The cannel coal is used simply for increasing the *quality*. I use about 65,000 tons of common coal, and about 6000 tons of cannel coal. The per centage of cannel is a little over 8 per cent. The illuminating power averages 16 candles."

On the same inquiry, and on the same day, Mr. Harry Jones, engineer of the Ratcliff Gas Company, made oath and said (page 216 of the official report): "I supply 14-candle gas. I make rather better than 10,000 feet to the ton. In the last half of the year I sold very nearly 9400 feet. The leakage is about 6 per cent. The proportion of cannel I use to common coal is 4 per cent." On page 221 this gentleman says: "I believe our leakage was, years ago, something over 20 per cent. I have no very strong opinion that I shall be able to reduce it below what it is now. I can only work with a view of reducing it. I have been so far successful. Whether leakage is a necessity, and cannot be got rid of altogether, I am not prepared to give an opinion."

This gentleman, Mr. Harry Jones, the engineer of the Ratcliff Gas Company, is an accomplished man in mechanics and physics. He is the son of Mr. Robert Jones, the experienced engineer of the Commercial Gas Company, which supplies the east end of London, and has been all his life engaged in and upon gas-works. He manages so as to sell all the gas he makes within 6 per cent., and is going on to reduce the leakage still further, not venturing to say, indeed, whether he will not get rid of it altogether.

I candidly confess that I think he will not get rid of it altogether; but after reducing it from more than 20 per cent. to less than 6 per cent., Mr. Anderson may well take "heart of grace" and make a similar attempt in Cork; and never should he say that what has been accomplished elsewhere is "a physical impossibility" in his own practice and under like conditions.

"A little bird" whispered to me that Mr. Anderson's leakage at Waterford is 24 per cent.! The Waterford works are leased by Mr. Anderson, and therefore entirely under his own control. Clearly, however strongly Mr. Anderson's *forte* may run in the direction of economizing fuel, it does not run in the direction of getting the maximum quantity of gas from a ton of coal, and of selling the largest quantity possible of the gas made.

19, *Great George Street, Westminster.* G. W. STEVENSON.

SIR,—The letter of Mr. George Anderson in your last issue is important, and inviting, as it does, a ventilation of the subject, perhaps I may be permitted to say a word.

It appears to me that this "per centage of leakage" is not only a misnomer, but also a convenient peg on which rival engineers and contending counsel hang out their banners, and air their magniloquence before learned commissioners and parliamentary committees. It is obvious that before any fair per centage can be struck, or a just comparison made, the conditions of each case should be equal, or at any rate known, and it appears to me somewhat strange that a highly scientific body to whom is entrusted the care, responsibility and management of the vast and important interests comprised in the gas supply of this kingdom should manifest so much indifference to the elimination of all possible sources of error.

In addition to the causes contributing to "leakage or unaccounted-for gas," so ably put before us by the above eminent engineer, there are others which should be taken into account.

Some companies, in estimating leakage, include all gas used by themselves both in manufacture and offices, bad debts, gas stolen, allowances to officers and servants, free lamps, and gas given to charitable institutions. Some disregard its hygrometric state, and fail to reduce its volume to the standard temperature and pressure (which alone is a source of error of great magnitude), fast registration of station-meters, unavoidable waste in alterations and repairs, and underestimation of the consumption of public lamps. These are all causes of considerable inaccuracy. Many companies scrupulously measure all gas used by themselves, and faithfully record all or some of the above items; and they, of course, favourably compare with those who do not.

Now, as this dust about leakage is very likely to be kicked up on future occasions, would it not be as well to endeavour to ascertain how much is really due to mains and services, and how much to other causes? Erroneous calculations and conclusions are inevitable under the present method of estimation, and I maintain that before a sound judgment can be formed, or a true "per centage" arrived at, the special features of each company's district and working must be taken into consideration.

One slight mistake Mr. A. will excuse me, I am sure, for pointing out. Alluding to the exosmoic action of gases, he says:—"The different specific gravities of different gases do not seem to interfere in its operation."

The law is, according to the late Professor Graham, Master of the Mint, who devoted untiring patience and labour to its confirmation, that:—"The force of diffusion is inversely as the square roots of the specific gravities." So that, taking atmospheric air and hydrogen, whose specific gravities are respectively 1 and ·069, their rates of diffusion will be 1 and

$$\sqrt{\frac{1}{\cdot 069}}$$

or 3·8; or by taking the familiar illustration of oxygen and hydrogen, the ratio of whose specific gravities is as 1 to 16, the square root of 1 is 1, the square root of 16 is 4; hence, inversely, the atoms of H possess four times more exosmoic power than the atoms of O, and so on with all known gases having no direct action on each other.

It was stated, at a recent meeting of the Gas Managers Association, that some genius of a manager contrived to *sell* all the gas he *made*. This is honestly impossible, and has its foundation probably in the false registration of consumers meters, or very profitable contracts for the sale of gas. The law of exosmose alone, excluding all other causes, produces a decided loss: and there can be no doubt whatever, to those familiar with the action of gases, that the loss from the continuous operation of this force is considerable, especially in those towns and districts which are compelled to work high pressures on the distributory apparatus, and wherever mains are laid in moist ground.

It is well known that if alcohol be kept in a bottle long, it is concentrated by this very action, and to my mind this accounts to a great extent for the trivial loss of illuminating power coal gas experiences after travelling the first 1000 yards. After its more condensable hydrocarbons are deposited, the hydrogen diffuses through the pores of the iron, leaving light-giving constituents behind. CHARLEMAGNE.

Dec. 10, 1873.

SIR,—I am sure that no one more than Mr. Anderson would deplore such a consequence of his letter in your last issue as that gas managers should be led to rest content with a leakage of 13 per cent. or less, and cease all efforts to improve their working in this particular.

I must on all grounds demur to the dictum that such a loss is, in most cases, inevitable.

In this view I am confirmed by the fact that I have ample cases of gas companies of all circumstances—metropolitan, suburban, provincial, and rural—whose leakage is very far below such an amount, and is annually being reduced. Many of them being quite within 10 per cent.

In the first place, I cannot agree to the supposition that 45° Fahrenheit will be the average annual temperature of the gas at the consumer's meter. Frost prevails only a few weeks in the year, and then seldom with such severity as to penetrate the soil, where the mains rest, more than two inches. Most consumers have their meters placed within their houses, where they are maintained at a temperature of from 50° to 60°, and even supposing the gas to have been below that temperature in the main and service, it is detained long enough in the meter to be raised to the same degree.

My own experience would certainly be that, on the average of the year, the consumption is registered at a slightly higher temperature than 60°.

As regards the condensation due to presence of vapour of water, Gay Lussac demonstrated that such vapour at 212° was only 1696 times the volume of its original water, and, therefore, at 60° would only be 1288 times its bulk. Moreover, gases at all temperatures, even at 30°, contain some vapour, and, therefore, the loss between 60° and 45° must be insignificant in the entire volume of gas.

Practically, little or no water is found in street-mains, beyond what has drained into them from the soil through defective joints, fractures, &c.; except, indeed, in such cases as where the condensing power at the manufactory is deficient. HY. E. JONES.

Ratcliff Gas-Works, Wapping, Dec. 12, 1873.

SKOINES'S PATENT GAS.

SIR,—The communication from Mr. Somerville, which appeared in your JOURNAL of the 2nd inst., caused me the utmost astonishment. The preliminary statements in the letter are, I most unhesitatingly affirm, simply untrue, so far as my knowledge extends. The drawing for the conversion of a setting of five retorts at Bray was prepared in my office, not by the consent of Mr. Somerville, but at the request of Sir John Gray, a director of the Alliance Company, and delivered out of my office on the express condition that Mr. Somerville should have nothing to do with the experiments, but that they should be conducted by one or more independent persons. So far from this condition having been observed, it now seems—and I learned it for the first time in your JOURNAL—that Mr. Somerville has caused the adaptation of the retorts to be made, Mr. Somerville has made the experiments, and Mr. Somerville has failed to obtain the result which other engineers have obtained, and which are now being obtained daily and constantly at Cricklewood and at Tenby.

Mr. Somerville says, "I have tried to get information as to how I have failed in obtaining the results stated to be realized by the process, but as yet have had no explanation." How, when, and from whom has Mr. Somerville sought an explanation of his failures? He has certainly not applied to me, or to Mr. Romans, or to Mr. Skoines, or to Mr. Cotton; and all the parties on this side of the water were in ignorance of the experiments at Bray having been made, until Mr. Somerville's letter, recording his failure, appeared in your JOURNAL.

I ask your readers whether it is fair, nay even decent, to make trial of a patented process behind the back of the patentee and of those having special knowledge of the subject; and when he fails to obtain the results which have been vouched for by men of reputation, to publish *his* failure to the world, and argue from such failure in condemnation of the patent, and in words of warning to gas companies.

And now, leaving Mr. Somerville, permit me to turn for a moment to Mr. Spice's letter.

It does not require the age and experience of my friend, the engineer of the New Gas Company, to understand that a proper setting of six retorts is heated with as small an expenditure of fuel as a setting of four retorts. If, then, four of the six retorts be charged with coal, the fifth with chalk, and the sixth with coke, and by the admission of steam the quantity of gas available for sale is made into double the quantity of that produced from the four retorts charged with coal, there is a clear saving of 50 per cent. of coal, without any increased consumption of fuel; the only marketable commodities destroyed being tar and ammoniacal liquor, which are always a nuisance upon a gas-work. The fallacy of Mr. Spice's figures is thus instantly established, and his £200,000 a year loss still remains £500,000 a year profit.

The second paragraph of Mr. Spice's letter, referring to the Skoines's patent, runs thus:—"It is a [compound] method of effecting by a single process or operation that which has been [much better] done by separate systems, under patents obtained previously by other men." Gracious heavens! here is a lot of contradictions. How can "a single process" be described as "a compound method," or who would say that "separate systems" for effecting an object are much better than "a single process or operation" for effecting the same object, if the object be equally effected in both cases? Now, sir, the brackets introduced into the sentence are mine, and I ask your readers to suppose the words within them to be omitted. The sentence then reads fairly well; it is not contradictory, and it admirably expresses my own view of Mr. Skoines's inven-

tion, although I am not prepared to admit that the whole of the process patented by Mr. Skoines has been separately and previously patented by other men.

I believe Mr. Skoines has hit upon a happy combination of processes which constitute one homogeneous and thoroughly practical process. The tar and ammoniacal liquor are redistilled in a marvellously simple and effective manner without the separate and costly redistillation of Dr. Eveleigh; and at the same time, and by the same process, the dried gas from steam is illuminated without the expensive, uncertain, and dangerous foreign element required by Ruck's patent which Mr. Spice has taken under his wing, and condescends to smile upon.

But, sir, it is comparatively useless to discuss the merits of patented inventions. There have been found people willing to put their money into Eveleigh's patent gas, Ruck's patent gas, Skoines's patent gas, and many other "witty inventions." Each one believes or hopes his investment may prove remunerative, but it will not be made so by the squabbling of engineers or by sharp criticisms on each other's pet schemes. At the meeting of the Gas Managers Association in June last I deprecated discussion on Ruck's patent, stating that I was quite sure it was safe in Mr. Spice's hands, and that if there were any good in it we should know more about it by that time twelvemonth. If it were devoid of merit or unworkable, it would go where so many other things once thought to be good have gone—into oblivion. What I then contended for in regard to Ruck's patent I now ask in regard to Skoines's. We have each quite enough to do in endeavouring to perfect our several systems, and so to benefit the great interest of gas manufacture.

G. W. STEVENSON.

19, *Great George Street, Westminster, Dec.* 13, 1873.

GAS PURIFICATION IN LONDON.

SIR,—Mr. Southby's estimate is wholly wrong, and the error is on the face of it. He overlooks the fact that the lime employed to decarbonate the soda-solution used in my soda process can be constantly revivified at hardly any cost. He himself saw this in his first letter, but reckoned the loss of material in the operation at 10 per cent. of the lime and 5 per cent. of the soda. Now, how so large a quantity of non-volatile substances, like lime and soda, is thus to disappear, I cannot conceive. But let us take Mr. Southby's own figures:

"Old dry lime process—100 tons at £1	£100
Patterson's soda process—90 tons lime at £1	£90
5 tons soda at £15	75
	£165"

These 90 tons of lime can be readily revivified in gas-works in the manner which I have described, and at a cost, I should think, of not more than a shilling a ton. Thus the loss on the lime would be, instead of £90, only 90s.; making the cost of the soda process only £80, as against £100 for the present lime process.

In fact, it would not cost more to revivify the lime (used in decarbonating the soda) than it costs in some places at present to cart the foul lime away from the works. As to Mr. Southby's statement that the process of decarbonating the soda liquor "*will be* a very offensive one," I can simply say that this is not the case. And if any one will say how nuisance is to be occasioned by putting lime into the fouled soda-liquor, whereby the carbonic acid (and a trifling portion of SH_2, in so far as there is any) is absorbed from the liquor, and sinks to the bottom of the tank in combination with the lime, I shall be much surprised.

R. H. PATTERSON.

AUTOMATIC LAMP LIGHTING.

SIR,—I agree with Mr. Price that our Automatic Lamplighters are similar in principle. I do not, however, concede that they are alike, or both equally serviceable for the purpose for which they are intended.

An essential point is that the lighting and extinguishing pressures must be different, and I believe I am doing Mr. Price no injustice when I state that in his lighter they are identical. This necessity will be more clearly understood when it is considered that in the majority of towns the hours of lowest consumption of gas are from midnight until 5 a.m., a time during which the lamps must be lighted, but only sufficient pressure need be maintained on the mains for this duty; whereas during the day, when the lamps are not required, fogs or manufactories sometimes call for extra pressure. The inconvenience will be at once seen of having an automatic lighter fixed, which would prevent the pressure being reduced during the night to a point considerably under that of the hours of greatest demand, or increased during the day as necessity called for without the danger in the one case of extinguishing the lamps or in the other of relighting them.

My lighter provides for this. There is a range betwixt the maximum, or lighting pressure, and the minimum, or extinguishing one, which allows the pressure within certain limits to be withdrawn after lighting is effected, and replaced after the lights have been put out. I may add that the price will not be expensive; but this, of course, can only be quoted in a trade advertisement.

A. F. WILSON.

18, *Buckingham Street, Adelphi, Dec.* 11, 1873.

GAS EXPLOSION AT HALIFAX.—On Thursday, Dec 4, a terrible explosion of gas, resulting in the death of five persons, serious injury to many others, and the total destruction of a large silk mill, occurred in this town. The premises where the catastrophe took place belonged to Messrs. S. C. Lister and Co., and were situated in Lower Wade Street. The building was five storeys high, the upper floors being devoted to the various processes of silk spinning (in which about 200 persons were engaged), while the basement was used as a warehouse for storing the raw silk in stock and the silk waste. At the lower end of this basement floor—that is, immediately adjoining Stone Dam Street—was a small room partitioned off containing the gas-meters for the whole of the premises, and it was here that the sad accident originated. The entrance to the building from the yard is also at this end of the building, and the gas-meters were placed just underneath and behind the staircase leading to the various storeys. This staircase was the only means of ingress and egress for the hands employed in the various floors, with the exception of a gangway at the other end of the mill, which communicated from the third storey with adjoining premises. From the various accounts published, it would seem that on the previous night one of the meters—a 150-light meter—did not act properly, and affected the supply, and a request was sent to the corporation gas offices that some one might be sent to ascertain the cause. Two men accordingly went at seven o'clock on Thursday morning, and proceeded to take steps to remedy the defect. They first tried to shut off the gas from the main, but finding that the valve was too stiff to turn, they resolved to do without turning the gas off. They, therefore, took off the cap of the defective valve, and put in a temporary wooden plug. While one of them was away, a few minutes before ten o'clock, fetching some tools, this plug was blown out by the pressure of the gas, and a tremendous rush of gas into the mill took place. Several lights were burning near at the time, and an explosion instantly followed. Some loose silk material was instantaneously ignited, and within a few seconds the woodwork of the mill was in flames. The fire spread with great rapidity, and, despite of the most strenuous exertions, the premises and their contents were soon a mass of ruins. Fortunately the great majority of the hands employed in the mills escaped uninjured, but when the fire was subdued, and the roll of names came to be called over, it was found that five poor girls had perished in the flames, and that more than a dozen others had been more or less injured. The damage to property is estimated at about £20,000.

Parliamentary Intelligence.

NOTICES GIVEN FOR PRIVATE BILLS (SESSION 1874) RELATING TO THE SUPPLY OF GAS AND WATER, &c.

ABERDARE AND ABERAMAN GAS.—Purchase of and transfer to the Aberdare and Aberaman Consumers Gas Company of the gas-works and undertaking of the Aberdare Gas Company; power to accept shares of company in payment of purchase-money, and to provide for the sale of shares and distribution of proceeds; application of corporate funds and capital powers of the company; further money powers, transfer of mortgage and other debts, and provision for payment thereof; confirmation of and agreements between the two companies; dissolution of the Aberdare Gas Company; powers to maintain and use gas-works and lands of Aberdare Gas Company; sale or lease of lands; amendment of existing Act; alteration of gas-rents and charges; to levy differential and other rents and charges; amendments of Acts; and other powers.

AIRDRIE AND COATBRIDGE WATER.—Additional capital; additional lands; agreement with local authorities and others for the supply of water in bulk or otherwise; amendment or repeal of Acts.

ALLIANCE AND DUBLIN CONSUMERS GAS COMPANY.—Amendment of Alliance and Dublin Gas Act, 1871; accelerating arbitration under; further provisions as to price, quality, and illuminating power of gas; additional money powers; variation of contracts; power to provide steam vessels; amendment of Acts.

BELFAST CORPORATION GAS.—Power to corporation to supply Belfast and its neighbourhood with gas; to purchase undertaking of Belfast Gaslight Company; to raise money; dissolution of gas company; alteration of price; amendment of Acts relating to corporation and to gas company.

BELFAST CORPORATION WATER.—Transfer to Corporation of Belfast of works and undertaking of the Belfast Water Commissioners; powers to corporation to supply water, to levy rates; dissolution of Belfast Water Commissioners; qualifications of electors of Water Commissioners; provisions with respect to commissioners; general powers; amendment of Acts.

BELFAST WATER.—Power to the Belfast Water Commissioners to construct additional reservoirs, aqueducts, and other works, and to afford an additional supply of water to the borough of Belfast and other places; power to take water from South Woodburn, North Woodburn, Dunerne, French Park streams: streams coming from Aikin's Glen to Dorisland, Copeland Water; Lough Mourne; stream or mill race from Craigboy, through Broad Island to mill known as Milltown, in Kilroot; stream passing near to the dwelling-house occupied by Robert Owen, and flowing into the stream leading to the mill known as Milltown, in Kilroot; cut or mill race diverting Lough Mourne and Copeland waters to mills and other works at or near Carrickfergus; stream called Beltoy or Dunisland, and other streams; purchase of lands and water by compulsion or agreement; power to apply funds, and borrow money; definition of certain expressions in Belfast Water Act, 1865, and extension of power to levy rates; superannuation of officers; power to make bye-laws: incorporation, amendment, or repeal of Acts; and other purposes.

BEVERLEY WATER-WORKS.—Incorporation of company; construction of works; supply of water to the borough of Beverley and adjacent places; compulsory purchase of lands, power to levy rates, rents, and charges; and powers affecting Local Board of Health of the said borough and other local authorities.

BIRMINGHAM GASLIGHT AND COKE COMPANY.—Amendment of Birmingham Gas Act, 1855; further capital; purchase of site of works and other lands by compulsion or agreement; construction of new gas-works; manufacture of residual products; power to use patents relating to gas; other provisions affecting the company's proprietors, creditors and consumers, and the public; amendment and incorporation of Acts.

BROADSTAIRS WATER.—Powers to maintain existing water-works, &c., and to supply water; to break up streets; to levy rates and charges, purchase and lease of lands by agreement; incorporation of company, and purchase by them of undertaking; to raise money by shares and borrowing; to confer rights and privileges; special provisions as to limitation of supply, and for protection of undertaking; amendment of Acts; other powers.

BROADSTAIRS WATER-WORKS.—Dissolution and reincorporation of the Broadstairs Water-Works Company, Limited; power to continue and improve the supply of water to Broadstairs and adjacent district, and to improve the company's works; to levy rates, rents, and charges; to break up streets, &c.; capital arrangements; alteration and extinguishment of rights; incorporation of general Acts; and other purposes.

CHESTER WATER.—Amendment or repeal of the Chester Water-Works Act, 1857; powers to company to raise additional capital; provisions as to supply of water and recovery of sums due; definition of "annual value"; power to company to purchase and hold, and to lease or otherwise dispose of premises for offices, &c.; provision as to supply of water to future public charities; directors and shareholders not to be disqualified in certain events; power to agree with local authorities and others; further powers to company.

CUPAR WATER.—Construction of works; power to take, compulsorily and otherwise, lands, waters, and other porperty, including waters of Craigrothie Burn, Clatto Stream, and Clatto Den Burn; power to supply water; power to borrow money; rates and assessments; repeal or amendment of Acts; other purposes.

DOVER CORPORATION.—Repeal or amendment of Municipal Corporation and other Acts, and local Acts; water supply; prevention of waste; misuse and contamination of water; and other purposes.

DUBLIN CORPORATION GAS (PURCHASE OF EXISTING GAS-WORKS, &C.).—Power to the Corporation of Dublin to purchase by compulsion or by agreement the entire of the existing undertaking of the Alliance and Dublin Consumers Gas Company; power to the corporation to borrow money for such purposes, or to arrange for the payment of the purchase moneys thereof by annuities, interest, dividend, or otherwise; power to the corporation to manufacture and supply and sell gas in and from such works; amendment of Acts; and other purposes.

DUBLIN CORPORATION WATER-WORKS.—Power to the Corporation of Dublin to borrow money on the security of the surplus of the existing water-rates; powers to diminish waste of water and protect supply from pollution; power to charge townships a meterage rate for water taken in excess of statutable allowance; purchase of plot of ground by compulsion, and to confirm agreement for additional land taken; power to apply out of public water-rate an additional sum for the purposes of the fire brigade, to extend time for construction of works, and to regulate obligations to supply water to extra-mural districts, and to enter into agreements with Town Commissioners for supply and distribution of water for other than domestic purposes; powers for construction of accommodation works for the washing of sheep; power to contract with directors or managers of public, official, or charitable institutions for supply of water; to define the principle upon which lands occupied as reservoirs or by conduits, &c., for the conveyance of water are to be valued; amendment of Acts; and for other purposes.

DUNDEE WATER.—Deviation in authorized aqueduct, conduit, or line of pipes from Lintrathen to Dundee; new aqueducts, conduits, or lines of pipes, and new reservoir, road, and other works; diversion and deepening of Gorrie Burn; power to take compulsorily and otherwise, lands, houses, and other property; powers of alteration of old and new works; rates and charges; additional borrowing and other powers; power to make and vary agreements with landowners and other parties; enlargement of constitution of

commissioners; repeal, alteration, or amendment of Acts; and other powers and purposes.

EDINBURGH AND DISTRICT WATER.—New works for additional supply of water from Moorfoot, including the river South Esk, Tweeddale Burn, and Portmore Loch, and for compensation from Fullarton Burn, and for additional storeage in Glencorse Valley; extension of limits of district; provisions for prevention of waste, amendment of constitution of trust, amended and increased rates, payment of costs of bill of 1871, and of part of the costs of opposing ratepayers; amendment of Acts; power to borrow; provision for separation of portion of undertaking applicable to Leith and Portobello on conditions, and new separate trusts; other purposes.

EDINBURGH AND DISTRICT WATER.—Alteration of constitution of Edinburgh and District Water Trust; new works for supplying district with water, and to intercept, impound, and to use the waters of the Talla and other waters; power to levy rates; provisions for prevention of waste; as to water fittings, and as to applications by trustees to Parliament; power to borrow; confirmation of agreement; payment of costs of bill of 1871, and of part of costs of opposing ratepayers; repeal or amendment of Acts; and other purposes.

ENNISKILLEN GAS.—Incorporation of company for acquiring and carrying on and improving the existing gas-works of Enniskillen, and power to borrow money; compulsory purchase of lands, and powers affecting the commissioners for the borough of Enniskillen.

FAIRFIELD LOCAL BOARD.—Power to local board to purchase and hold water-works, and to construct new water-works; purchase of lands by compulsion or agreement; power to levy tolls, rates, &c.; extinguishment of rights, &c.; application of funds to purposes of Act; further power to raise money by mortgage, &c.; and for other purposes.

FYLDE WATER.—New works; purchase of lands; extension of limits of supply; increase of share capital; borrowing powers; levying of rates; repeal, amendment, and incorporation of Acts, and other purposes.

GRANTHAM GAS.—Dissolution and reincorporation of Grantham Gaslight and Coke Company; increase and regulation of capital; supply of gas in Grantham and other places; maintenance, extension, and improvement of existing works; compulsory purchase of land, and erection of new gas-works; power to levy gas-rates; contracts with public bodies; and other powers and purposes.

HARTLEPOOL GAS AND WATER.—New works in connexion with Hurworth reservoir; new reservoir on the Hart Burn, and works in connexion therewith; compulsory purchase of lands; additional capital; amendment of Acts; and other purposes.

HORBURY LOCAL BOARD.—Water-works; supply of water; agreement with Soothill Upper Local Board, or other parties, as to supply of water; sewage and utilization of sewage; incorporation and amendment of Acts; and other purposes.

HYTHE IMPROVEMENT, DRAINAGE, AND WATER-WORKS.—Repeal of local Acts; new water-works; extension of borrowing powers; and other purposes.

LEEDS CORPORATION WATER, GAS, AND IMPROVEMENT.—Extension of limits of gas supply and water supply; provisions for protection of water supply; power to raise additional money for water-works; defining meaning of "annual value" in water-works Acts; power to charge increased price for gas; power to levy rents and charges, and to alter existing rents and charges for water and gas, and to levy higher rates and charges without the borough; amendment of Acts; and other purposes.

LIMERICK GAS.—Incorporation of company; transfer to and vesting in company of gas undertakings of Corporation and United General Gaslight Company, and dissolution of that company; extension of works; amendment of Acts.

LIVERPOOL CORPORATION WATER-WORKS.—Powers to make bye-laws and regulations to prevent waste, misuse, and contamination of water; to regulate and stamp water fittings, and to appoint authorized plumbers; power to constitute districts, and to contribute portion of expense of water fittings; power to levy penalties; provisions to prevent contamination of water in wells and reservoirs; reduction of water-rate; amendment of provisions as to payment of water-rents, and as contributions to water account; amendment of Acts; and other purposes.

LLANELLY GAS.—Repeal of existing Act of Llanelly Gaslight Company and reincorporation of that company; supply of gas to Llanelly and surrounding district; power to acquire and hold lands, and maintain, improve, and construct gas-works; money powers; agreements with local authorities and others; power to Llanelly Local Board of Health to acquire gas-works; amendment of Acts.

LOFTHOUSE AND LIVERTON GAS.—Incorporation of company, with powers to manufacture gas and residual products, and supply gas within the parishes of Lofthouse, Easington, and Skelton; to use patent rights, purchase land, and erect works; powers as to capital and borrowing; to lay mains and pipes, &c.; to levy gas-rates, rents, and charges, agreements with local authorities, &c.; repeal, amendment, and incorporation of Acts; and other purposes.

LYMM WATER.—Incorporation of company; construction of works; purchase of lands; power to agree with local boards, &c.; capital; rates; amendment and incorporation of Acts; and other purposes.

METROPOLIS GAS.—Amendment or repeal of the Metropolis Gas Act, 1860, and of the City of London Gas Acts, and Acts relating to existing gas companies; compulsory purchase of existing gas-works supplying the metropolis; power to the Metropolitan Board of Works and to the Corporation of the City of London to raise money for that purpose; to levy rates, &c.

MIDDLESBOROUGH EXTENSION AND IMPROVEMENT.—Extension of gas-works and district of supply; powers to manufacture gas and residual products; to lay down mains, pipes, &c.; alteration and increase of rates and charges for gas; repeal, amendment, and incorporation of Acts, Charter, Orders in Council, and Provisional Orders; and other purposes.

MID LOTHIAN WATER.—Additional works; increase of capital; amendment or partial repeal of Edinburgh and District Water-Works Act, 1869; exclusion of Leith, Portobello, &c., from the operation of that Act, and power to company to supply water to those towns; reconstitution of Edinburgh and District Water Trust; power to Edinburgh and District Water Trustees to alter existing water-rates, and to levy tolls, rates, and duties; power to Town Councils of Leith and Portobello to levy rates, tolls, and duties, and to apply funds; power to company to supply water to other companies and public bodies; power for transference of the undertaking of the Mid Lothian Water Company to the Edinburgh and District Water Trustees or to public trust to be constituted; power to levy rates; amendment or repeal of sec. 52 of the Mid Lothian Water Act, 1873; alteration of rates, &c., in that Act; amendment of Acts.

MUSSELBURGH AND DALKEITH WATER.—Extension of time granted by Musselburgh and Dalkeith Water Act; extension of area for compulsory supply; arrangements between Musselburgh and Dalkeith Water Trustees and local authority of Dalkeith, and between these bodies and the Edinburgh and District Water Trustees as regards source of supply, works, and distribution of water; further borrowing powers, and otherwise amendment or repeal of Acts.

NEATH CORPORATION (PURCHASE OF WATER-WORKS AND GAS-WORKS).—Transfer to the Corporation of Neath of the Neath undertaking of the Neath Water Company, and of the undertaking of the Neath New Gas Company; powers to corporation for supply of gas and water; agreements between corporation and gas and water companies, and winding up of those companies; agreements between corporation and other local authorities; power to levy rates and charges and to borrow money; incorporation and amendment of Acts.

NOTTINGHAM GAS AND WATER (TRANSFER TO CORPORATION).—Purchase by the Corporation of Nottingham of the undertakings of the Nottingham Gaslight and Coke Company and the Nottingham Water-Works Company; winding up and dissolution of those companies; powers to corporation to carry on undertakings, to break up roads, &c., to levy rates, and borrow money; amendments of Acts.

NOTTINGHAM WATER-WORKS COMPANY.—Extension of limit for supply of water; additional lands; increase of capital; amendment of Acts.

PADIHAM WATER-WORKS.—New works; extension of limits; purchase of lands; additional capital; amendment of Acts.

PETERBOROUGH GAS.—Supply of gas to Peterborough and surrounding district; power to acquire and hold lands, and maintain, improve, and construct gas-works; money powers; price of gas; reference to Board of Trade; amendment of Acts and incorporation of Acts.

SHIPLEY LOCAL BOARD OF HEALTH.—Repeal, alteration, consolidation, and re-enactment of Acts, Order in Council, and Provisional Orders; extension of limits of water supply; supply of water in bulk or otherwise; alteration of water rates and rents; protection of works and springs; amendment of Acts; and other purposes.

SKIPTON LOCAL BOARD OF HEALTH.—Powers to purchase undertaking of Skipton Water Company; dissolution of that company; power to supply water; agreements with public and local bodies; powers to purchase additional lands, and to dispose of superfluous lands; provisions for payment of expenses of Act and transfer of water-works; other powers; amendment or repeal of Acts.

SOUTH LANCASHIRE WATER-WORKS.—Extension of time for purchase of lands and completion of works; powers to agree with corporation of Bolton for supply of water by them to the company in bulk; provisions as to vesting undertaking and powers of company in local boards of Adlingdon, Horwich, Blackrod, Aspull, Haighton, Westhoughton, Pennington, Bedford, Westleigh, and Hindley; and power to those local boards to raise and apply funds; confirmation of agreements; dissolution of company; other powers; amendment or repeal of Act.

TRURO WATER.—Incorporation of company; purchase of existing undertaking and works; new works; limits of supply, power to break up streets; purchase of lands; capital, tolls, rates; repeal, incorporation, and amendment of Acts; and other purposes.

TUNBRIDGE WELLS GAS COMPANY.—New lands; additional works; extension of limits of supply in Tunbridge, Penbury, Speldhurst, and Frant; increase of capital; power to use patents; other provisions affecting the company's proprietors and consumers, the Tunbridge Wells Improvement Commissioners and Local Board and the public; amendment of Act; incorporation of general Acts.

ULVERSTON LOCAL BOARD.—Sale of undertaking and transfer of powers of Ulverston Gas Company to the local board; dissolution of that company; additional gas-works; sale of undertaking and transfer of powers of Ulverston Water Company to the local board and the Corporation of Barrow-in-Furness distributively; partial resale by local board; dissolution of water company; supply of water by Barrow Corporation to local board, and construction of works for same; confirmation of agreements; supply of gas and water by local board; works of sewerage; compulsory purchase of land for same; powers to local board and Barrow Corporation respectively to borrow money; creation of annuities; power to Barrow Corporation to apply existing funds; incorporation, repeal, and amendment of Acts; and other purposes.

WAKEFIELD AND DISTRICT NEW WATER-WORKS.—Incorporation of company for supplying Wakefield and the neighbourhood with water; construction of water-works; compulsory purchase of lands and appropriation of waters; rates, &c.; acquisition of existing water-works; power to Wakefield Corporation to purchase or lease undertaking; incorporation of Acts; amendment of Acts; and other purposes.

WAKEFIELD WATER-WORKS.—New reservoir at or near Langsett, and other reservoirs, pipes, and works for supplying water to Wakefield and neighbouring districts; acquisition of water from the Little Don River and its tributaries; provisions as to compensation; extension of limits of supply; compulsory purchase of lands, &c.; provisions as to supplying water in bulk to local boards, &c.; rents, rates, and charges; increase of capital and borrowing powers; meters, &c.; abandonment of power to take water from the Calder, and of certain works; repeal, amendment, and consolidation of Acts.

WATERFORD GAS.—Power to purchase lands by agreement, and to erect gas-works thereon; enlargement of existing works; further capital; classification and definition of capital; varying of rates; increase of illuminating power; amendment of Act.

WESTLEIGH, PENNINGTON, AND BEDFORD LOCAL BOARDS.—Powers to local boards of Westleigh, Pennington, and Bedford to acquire the undertaking of the Leigh District Gas Company; dissolution of that company; powers to the local boards to supply gas within their respective districts and the limits of the gas company; to purchase lands; to maintain and construct works; manufacture and supply of gas and residual products, meters, fittings, &c., and to acquire and exercise patent rights; agreements with public and local bodies; appointment of and delegation of powers to joint committee; provisions with reference to apportionment of costs and division of receipts of joint undertaking, and for payment of expenses of Act; further powers as to alteration, levying, and recovering of rates; application of funds; new and additional borrowing powers; amendment or repeal of Acts; and other powers.

WIGAN IMPROVEMENT.—Purchase of gas-works; purification and utilization of sewage; sanitary and other improvements; amendment of Acts.

WOODCOTE WATER.—Incorporation of company; construction of water-works and supply of water to Woodmansterne, Woodcote, Wallington, Chipstead, Banstead, Beddington, Carshalton, Kew, Epsom, Morden, Mitcham, Merton, Wimbledon, Wandsworth, Mortlake, Barnes, Putney, Petersham, Kingston, West Sheen, Richmond, and other places in the county of Surrey; compulsory purchase of lands, power to levy rates, &c.; incorporation of Acts.

WREXHAM WATER-WORKS.—New reservoirs and works; power to impound and take waters of tributaries of Pentrebychan Brook; power to vary existing rates, &c.; additional capital; change of name; provisions for regulating supply and preventing waste and misuse of water; extension of limits of supply; power to enter into contracts and agreements with reference to the supply of water in bulk; amalgamation of undertaking of Ruabon Water Company and Brymbo Water Company; amendment of Acts.

YSTRAD GAS AND WATER COMPANY.—Alteration of maximum price of gas; revival of power and extension of time for making certain gas-works; amendment of Acts and Provisional Order.

NOTICES OF APPLICATIONS TO THE BOARD OF TRADE (SESSION 1874) UNDER THE GAS AND WATER FACILITIES ACT, 1870.

BRAINTREE AND BOCKING GAS.—For power to maintain and continue gas-works; to define limits of supply; power to break up streets and recover rents; to raise additional capital; to acquire additional land; incorporation of Acts; and for other purposes.

BROUGH, ELLOUGHTON, AND WELTON GAS COMPANY, LIMITED.—For powers

to maintain existing gas-works and to enlarge same; limits of district; power to break up roads; to levy rates; incorporation of Acts; and for other purposes.

CEFN WATER.—For power to extend limits of supply; break up roads, streets, &c.; to acquire lands, &c., by agreement; additional capital; power to enter into agreements with other companies jointly to supply adjoining districts; amendment and incorporation of Acts; and other purposes.

CHELMSFORD GAS.—For power to maintain and continue gas-works; to define limits of supply; power to break up streets and recover rents; to raise additional capital; to acquire additional land; incorporation of Acts; and for other purposes.

DARTFORD GAS.—For powers to construct and maintain works for the manufacture and storeage of gas and residual products, and to apply moneys for the purpose; amendment of the Dartford Gas Act, 1867.

DEAL WATER-WORKS COMPANY.—To raise additional capital.

GUILDFORD GAS.—For power to extend limits of supply; to break up streets and levy rents; to raise additional capital; incorporation of Acts; and other purposes.

HARWICH GAS.—For power to maintain and continue gas-works; to define and extend limits of supply; power to break up streets and recover rents; to raise additional capital; to acquire additional land; incorporation of Acts; and for other purposes.

HIGH WYCOMBE WATER.—For construction of works and supply of water in the borough of Chepping Wycombe (otherwise High Wycombe) and the parish of Chipping Wycombe, both in the county of Buckingham; purchase of existing works; lease or sale of works to Corporation of Chepping Wycombe and Local Board of Chipping Wycombe; rates and duties; amendment of Acts.

HIGH WYCOMBE WATER.—For authority to construct water-works and to supply water to High Wycombe (otherwise Chepping Wycombe), and other places in the county of Bucks; acquisition of existing water-works; powers to High Wycombe Corporation and Local Board to purchase or lease undertaking; rates, &c.

INVERNESS GAS AND WATER.—For power to increase the capital of the company, and for amendment of Act.

LOFTHOUSE AND DISTRICT GAS.—For powers to construct and maintain gas-works in Skinningrove, in the North Riding of the county of York, and to supply the parishes or townships of Lofthouse, Easington, Liverton, Brotton, Skinningrove, and Kilton, all the North Riding of the county of York, with gas, and to acquire lands by agreement.

LOFTHOUSE AND LIVERTON GAS.—For powers to acquire land and construct gas-works; to define limits; to hold and use licences; to manufacture and supply gas and residual products; to lay down mains and pipes; to break up roads; to supply meters, fittings, and other apparatus; and to levy rates and charges; and for other purposes.

MAIDENHEAD WATER.—For authority to construct water-works and to supply water to Maidenhead and other places in the county of Berks; powers to corporation to purchase or lease undertaking; rates, &c.

MAIDSTONE WATER-WORKS COMPANY.—The acquisition of additional lands and waters; the maintenance of additional works; confirmation of agreements; amendment of Acts.

RETFORD GAS AND COKE COMPANY, LIMITED.—For power to maintain and continue gas-works, and to manufacture, store, and supply gas and other products within the parishes of East Retford, West Retford, Ordsall, and Clarborough, all in the county of Nottingham; to alter, extend, enlarge and renew the said works; to make agreements with public bodies and others; to levy rates; and do all other acts necessary for the carrying on the business of a gas company.

ROMFORD GAS.—For power to maintain and continue gas-works; to increase and to define limits of supply; power to break up streets and recover rents; to raise additional capital; to acquire additional lands; incorporation of Acts; and for other purposes.

RUTHIN WATER COMPANY.—For power to raise additional capital.

SIDMOUTH GAS.—For power to maintain and enlarge gas-works; to acquire land, and construct additional, and maintain or discontinue existing gas-works; to define limits; to hold and use licences; to manufacture and supply gas and residual products; to lay down mains and pipes; to break up roads; to supply meters, fittings, and other apparatus; to levy rates and charges; and for other purposes.

SUTTON-IN-ASHFIELD GAS.—For power to maintain and continue gas-works, and to manufacture and supply gas within defined district; to raise additional capital; break up streets; make agreements with public bodies and others; levy rates, &c.

Legal Intelligence.

VICE-CHANCELLOR'S COURT.

LINCOLN'S-INN, WEDNESDAY, DEC. 3, 1873.

(*Before Vice-Chancellor* MALINS.)

THE WILTS AND BERKS CANAL NAVIGATION COMPANY, LIMITED, *v.* THE SWINDON WATER-WORKS COMPANY, LIMITED.

Mr. PEARSON, Q.C., and Mr. C. M. ROUPELL appeared for the plaintiffs; Mr. GLASSE, Q.C., Mr. BRISTOWE, Q.C., and Mr. W. W. KARSLAKE appeared for the defendants.

This case, the arguments in which were commenced on the 19th ult., and continued on the 24th, was concluded this day. It was a suit instituted by the company of proprietors of the Wilts and Berks Canal, which is 52 miles in length, and extends from Lemington, in the county of Wilts, to Abingdon, in Berkshire), in order to prevent the Swindon Water-Works Company from diverting into a reservoir, which they have constructed near the village of Wroughton, in the county of Wilts, the water flowing from a cluster of springs near that village, called "the Seven Springs," which water would, but for such diversion, flow through a culvert along the western side of the reservoir into a stream called the Wroughton stream, and so down into the plaintiffs canal. The plaintiffs rested their case upon an Act of Parliament passed in the year 1821 (1 & 2 Geo. IV., cap. 9), which, after reciting and repealing six Acts of George III., under which the system of canals and cuts now forming the Wilts and Berks Canal was constructed, consolidated those canals and cuts into one common concern, vested the whole property in the plaintiffs company, and empowered them to maintain and keep the united canal navigable for boats, barges, and other vessels, and for that purpose to supply it for ever thereafter with water from all rivers, springs, brooks, streams, and water-courses which had been or should be found within 2000 yards from any part of their canal, or any reservoirs belonging thereto, and to deepen, widen, enlarge, or strengthen any watercourses brought into the same, and to make reservoirs to supply their canal with water. This Act, the plaintiffs insisted, gave them the exclusive right to all surface water in defined channels within 2000 yards of their canal, and having in the year 1807 altered the course of the Wroughton stream so as to make it flow into their canal, they complained that the defendants, who were formed in the year 1866 as a limited company for supplying the towns of Old and New Swindon with water, had not only, by converting a valley near Wroughton into a reservoir, appropriated water to which the plaintiffs were entitled, but had also diverted the Wroughton stream into their reservoir.

On behalf of the defendants, it was contended that the plaintiffs were only entitled to so much water as was required for the purpose of the navigation of their canal, and that, as the water of the Wroughton stream was not wanted by the plaintiffs for the legitimate purpose of their canal, they (the defendants) were entitled to divert it for the purpose of supplying the inhabitants of their district with water. It was further alleged that the canal company had more water than they were entitled to, for they had actually for many years been selling water from their canal to the Great Western Railway Company, and had offered it for sale to the railway company in November, 1870, when the diversion complained of was effected.

The VICE-CHANCELLOR, in delivering judgment, said that the company which was now represented by the plaintiffs had been originally established as far back as 1795, under one of the Acts recited in the Act of 1821; and from 1795 down to the year 1870 there was no allegation of any deficiency of water in the canal. The traffic, however, upon the canal had greatly diminished—had been, in fact, virtually destroyed by the establishment of railways—its earnings were small, its shares were almost at a nominal value, and there was even evidence to show that in 1870 the company were considering whether steps should not be taken for winding it up. During this period, however, important changes had occurred in the neighbourhood of Swindon, and a largely increased population had been attracted to that place, not only by the increased traffic introduced by the Great Western Railway, but also by the large engineering works which that company had established there. This increase of population had caused an increased demand for water, and the supply being insufficient, and there being no regular water-works company in existence, the defendant company was established in the year 1866, not under the authority of any Act of Parliament, but as a limited company under the Joint-Stock Companies Act of 1862. They commenced operations in 1867, and it became necessary for them, and of the highest importance to the district, that they should obtain a supply of good and pure water. In that state of things their engineer fixed upon the Seven Springs which formed the source of the Wroughton stream, and the company went to the valley and took, and continued to take, in greater or less quantities, water therefrom, down to the summer of 1870. That was a very hot summer; there was a great dearth of water and many streams were dried up, so that while the company, had up to that time only used the water of the Seven Springs in a limited way, they then turned it into one channel, closing a hatch if they wanted all the water, and if not, letting it flow down. This led to applications by the plaintiffs, and ultimately to the present litigation. This litigation raised questions of great importance to the community; for if the contention of the plaintiffs was right, they, and all canal companies having similar powers, would be in a position to prevent water companies from being started without their permission. The question depended upon the proper construction of the Acts of Parliament under which the plaintiffs claimed. Could the Legislature have intended to confer upon the company the rights of a riparian proprietor, or, as had been contended, even more extensive rights? His honour thought not. The rights and obligations of a riparian proprietor were well known. He must not throw water back on those above him, or let it down on those below him in diminished quantity or altered quality. The water must be available for all purposes to which water is ordinarily applied, and if the plaintiff company had been in this case in the position of a riparian proprietor, his honour would have been, upon the evidence, obliged to come to the conclusion that there had been a user of the water by the defendants which would not have been justified. This seemed rather to have been the view of the defendants themselves, for they had bought up the rights of the riparian proprietors. What, however, must be taken to have been the intention of the Legislature? At the time the Act was passed, population was increasing, as it ever had in England. New wants were arising, and must it not be understood and assumed that among things which were matters of necessity was the supply to human beings, as they collected together in larger masses, of pure water? He thought the canal company could only be entitled to such water as might remain after the necessities of mankind had been satisfied, and that the right to take water to supply to human beings was one which the Legislature could not have intended to interfere with. It could not, surely, be the meaning of the Act that, after it was passed, no person other than the plaintiffs could take water for any purpose within 2000 yards from the canal, although the company did not want it and that simply because the company might want it at a future time. Was he to deprive the inhabitants of this district of pure water in order that this broken-down undertaking might carry on a navigation which did not exist? There was this additional objection to the plaintiffs case—they were themselves restricted from taking any tributary of the Thames. The Wroughton stream either ran into the river Ray, or was itself the river Ray, it was not clear which; and as the river Ray ran into the Thames, the Wroughton stream was, therefore, a tributary of the Thames, and the obligation was imposed upon the plaintiffs of taking no water from it. Again, there was no evidence of any deficieney of water in the canal before 1870. There was abundance of water now, and it appeared that the Great Western Railway, who wanted the water for their important purposes, had been from 1843 to 1867 in the habit of buying water from the plaintiff company, having purchased on an average 40 million gallons in the year; and that in November, 1870, while the company were, as they said, suffering from want of water, one of their clerks wrote to Mr. Armstrong, the engineer of the Great Western Railway, offering to supply the railway company with water. Upon the whole case his honour came to the conclusion, first, that upon the true construction of the Acts of Parliament the defendants had not done anything they were not entitled to do; and secondly, that the plaintiffs had failed to show any appreciable damage or deficiency of water. The plaintiffs having only the right to take water for the purposes of their canal were not entitled, speculating upon what might hereafter happen, to ask a court of equity to interfere with the right of riparian proprietors, or with those of this proper and useful water company. The bill must be dismissed with costs.

THURSDAY, DEC. 11.

(*Before Vice-Chancellor* HALL.)

THE ATTORNEY-GENERAL AND OTHERS *v.* THE CORPORATION OF BARNSLEY.

Mr. DICKINSON, Q.C., Mr. E. CUTLER, and Mr. S. H. BURBURY were for the Attorney-General and the plaintiffs; Mr. KARSLAKE, Q.C., and Mr. HUNTER were for the defendants.

This suit was instituted in 1871 by information and bill. The information was filed by the Attorney-General on the relation of the Right Hon. William Thomas Spencer, Earl Fitzwilliam, the Right Hon, Charles, Viscount Halifax, Richard Micklethwaite, Esq., and Francis Howard Taylor, Esq., as informants. The bill was filed by the same noblemen and gentlemen, without the Attorney-General, suing on behalf of themselves and all other owners and occupiers of land on the banks of the river Dearne, below Hoyle Mill, in the township of Ardsley, in the parish of Darfield, in the county of York. The information and bill—which were, in fact, one document—were both against the above-named defendants, and prayed—(1) an injunction to restrain the defendants from causing and permitting any sewage or other noxious or offensive matter from an intended new sewer, or from any other sewers draining that part of the borough of Barnsley called the "Old Town," or any other part of the borough which was not drained into the river Dearne, to pass into a main sewer, or to be conveyed into the river by any other channel; and (2) to restrain the defendants from continuing, after a day to be appointed by the court in that behalf, to permit the discharge into the river of any sewage or other noxious or offensive matter

from the borough, or any works within the same, either by the existing main sewer, or by any other channel or means whatsoever under the control of the defendants, and that provision might be made for payment of the costs of the suit. The information stated, *inter alia*, that the defendants in their corporate capacity were identical with the Local Board of Health of Barnsley, and the sole nuisance authority within the borough. The borough itself was situated wholly on the south-west side of the valley of the river Dearne, which was not a public river, and into which until the construction of the sewers by the defendants, as hereinafter mentioned, only a very small portion of the sewage of the district passed. In 1862 the then Local Board of Health constructed a certain system of sewers, and among them a main sewer, receiving the contents of other sewers and drains in the district, and discharging them into the river Dearne, at a place called Hoyle Mill. The defendants had since continued the system of their predecessors, and the discharges into the river had continually increased, amounting in 1871 to about 870,000 gallons a day, and not deodorized or rendered innocuous in any way. The population of Barnsley at that time—viz., 1871—exceeded 23,000. The river Dearne at Hoyle Mill and below that place was about 6 yards wide and 3 feet deep, with a velocity insufficient to carry off the accumulated and increased discharge of sewage. Previous to the adoption of the defendant's system of drainage, the river from Hoyle Mill to Wath-upon-Dearne had been used by men and animals for drinking, bathing, agricultural and domestic purposes, and for fishing; but since the defendants new system had been in vogue the river had become unfit for any of those uses. The plaintiffs, other than the Attorney-General, were owners of the land on the banks of the river, between Hoyle Mill and Wath-upon-Dearne, and the pollution of the river was a great injury to their property. In addition to the sewage of the borough, the refuse from some gas-works, dye-works, and other manufactories within the jurisdiction of the defendants, as such Local Board of Health and nuisance authority, was permitted by them to flow both directly and through the main sewer into the river, increasing the mischief caused by the sewage matter. The defendants had proposed (but since abandoned the proposition) to construct further sewers for draining that part of the borough called the "Old Town" into the river, the sewage from which did not in 1871 flow into it; and in particular had intended to take it through the main sewer. The "Old Town" had an increasing population, and the plaintiffs, dreading the extensive pollution which would arise from the further prosecution of the defendants system of drainage, and the injury therefrom to the public and individuals in the neighbourhood, instituted this suit for the above-mentioned purposes. As usual in cases of this sort, the pleadings were very voluminous; and the evidence of witnesses, both scientific and others, lengthy and conflicting. The principal grounds on which the defendants resisted the prayer of the information and bill were three—first, that there was, in fact, no nuisance created by their works; second, that if there was, it was a private nuisance only, and not a public one, for which the Attorney-General need not have been made a party to the proceedings; and third, that what had been done by the defendants was but a continuation of what was commenced in 1853, carried on ever since, done by the defendants, *bonâ fine*, in the discharge, as a public body, of their obligations to their constituents; and, moreover, with the knowledge and acquiescence of the plaintiffs themselves.

The VICE-CHANCELLOR, in giving judgment, stated the facts of the case, and, having carefully considered the various objections raised to the information and bill, expressed his opinion on the evidence as being in favour of the plaintiffs, overruled the objections, and made a decree restraining the defendants from continuing after the 22nd of May, 1874, to permit the discharge into the river Dearne of any sewage or other noxious or offensive matter from the borough, or any works within the same, either by the existing main sewer, or by any other channels or means whatsoever under the control of the defendants, and ordered them to pay the costs of the suit.

IRISH COURT OF COMMON PLEAS.

DUBLIN, THURSDAY, DEC. 4.

(*Before Justice* MORRIS *and a Common Jury.*)

LIABILITIES OF GAS COMPANIES.

FARQUHARSON *v.* ALLIANCE AND DUBLIN GAS COMPANY.

Mr. HAMILL, Q.C., and Mr. W. BOYD appeared for the plaintiff; Mr. P. MARTIN and Mr. J. O. BYRNE for the defendants.

This was an action to recover damages for an injury caused to the plaintiff through alleged negligence on the part of the defendants. The defence was a traverse of the negligence, and an allegation of contributory negligence on the part of the plaintiff.

The plaintiff's case was that in August last the defendants were making some improvements in their pipes between Carlisle Bridge and D'Olier Street. On the 26th of that month the plaintiff stopped to look at what was being done. Workmen were chipping an iron pipe, and a splinter struck plaintiff on the neck, wounding an artery, and necessitating immediate recourse on his part to Jervis Street Hospital. He alleged that the defendants had not used proper precautions to protect the public from those splinters, or given notice by placard or otherwise that they were to be avoided.

On the part of the company, witnesses were examined to prove that they placed a gate at that part of the ground where the work was going on, to keep the public away, and that they had instructed their workmen, and also the police, to prevent the public from stopping there.

The jury found for the plaintiff—£50 and costs.

DUBLIN SOUTHERN DIVISION POLICE COURT.

THURSDAY, DEC. 4.

(*Before* Mr. WOODLOCK.)

CHARGE OF EMBEZZLEMENT FROM THE ALLIANCE AND DUBLIN GAS COMPANY.

Joseph Fagan, late cashier of the Alliance Gas Company, was brought up on remand, charged with having embezzled the sum of £358, the property of his employers.

Mr. C. MOLLOY appeared to prosecute; the prisoner was defended by Mr. WHITE.

Mr. WHITE called the attention of the bench to the Summary Jurisdiction Act (18 & 19 Vict., cap. 126, sec. 2), under which, by consent of the accused, the magistrate had power to deal with a case of this kind summarily. He asked, on behalf of the prisoner, that that course might be adopted.

Mr. MOLLOY, on behalf of the prosecution, said that he had no objection to have the case disposed of summarily. He believed there was no doubt as to the jurisdiction of the magistrates, and his clients would offer no objection to it.

Mr. WOODLOCK said that in a case of embezzlement for so large a sum as £358, he did not think he ought to deal with it summarily.

Mr. WHITE said the prosecutors no doubt took into consideration the long services of the prisoner, and his hitherto unimpeachable character; in addition to which Mr. Fagan had been suffering for a long period under a severe illness. He presumed that these were the reasons why his worship ought to deal with the matter.

Mr. WOODLOCK said it would be a very long stretch of jurisdiction on his part to try a man, and deal with him summarily, on a charge of embezzlement of £358. These matters of long services and ill health would be taken into consideration by the court before whom he would be tried.

Evidence was then given of the payment to prisoner of certain sums of money, and that he had not accounted for them to the company. Prisoner, who is not married, was in receipt of a salary of £225. At the close of the case for the prosecution,

Mr. WHITE again appealed to Mr. Woodlock to deal summarily with the case. The prisoner asked for it. The directors, he might almost say, asked for it, and, at all events, did not oppose it, and he thought, as his worship had the power, the circumstances of the case fully justified it. The prisoner had spent the best twenty-five years of his life in the service of the company. He had unfortunately been drawn into some unlucky speculations, and had lost money. When he took this money he did so with the belief that he would be able to repay it before the discovery was made. He bore a good character otherwise.

Mr. WOODLOCK declined to take the responsibility of dealing with such a case summarily. The observations which Mr. White had so forcibly put would doubtless have due weight with the judge who would hereafter hear the case. It was his duty to send the case for trial, and he would do so.

Mr. WHITE asked that the prisoner might be admitted to bail.

Mr. WOODLOCK was not disposed to comply, especially when the commission was so near at hand.

After some conversation, it was resolved to remand the prisoner for a week, and then to send him for trial before the Recorder at City Sessions.

On Thursday, Dec. 11, the prisoner was again brought up, and fully committed for trial on the charge of embezzlement.

Miscellaneous News.

GAS AND WATER-WORKS FACILITIES ACT, 1870, AMENDMENT ACT, 1873.

GLASGOW (CORPORATION) GAS.

The Board of Trade have granted a Provisional Order to the Corporation of Glasgow, under the powers conferred upon them by the Act of last session, authorizing an increase in the price of gas from 4s. 7d. to 6s. per 1000 cubic feet. The order takes effect from the 1st inst.

METROPOLIS GAS SUPPLY.

METROPOLITAN BOARD OF WORKS.

At the Meeting of the Board on Friday, Dec. 5—Colonel HOGG, M.P., in the chair,

The Works and General Purposes Committee made a report in which they stated that they had considered the letter from The Gaslight and Coke Company, referred to them at the last meeting of the board, in which latter the company asked whether the board would be disposed to agree with them to an increase in the price of gas in order to meet the extraordinary expenses of the year 1874. It did not appear to the committee that this was a suggestion in which the board could agree, and they recommended that the company be informed to that effect, and further that the board would be compelled to oppose any application which the company might make to the Board of Trade to effect their object.

Mr. NEWTON, in moving the adoption of the report, said the gas company asked the board to agree to an increase in the price of gas over that which was made at the beginning of the present year. And in making their request the company stated that the Board of Trade inquiry this year involved an expenditure of £4000, which was indirectly a charge upon the consumers. It was a very difficult thing to understand how or why that inquiry should have cost so much. The inquiry took place before commissioners appointed by the Board of Trade, under the Act of 1868, and the Corporation of London and this board, as the local authorities of the metropolis, were entitled to appear and oppose the application and defend the interests of the consumers. The corporation and this board did appear, and they had made a claim upon the company for their joint expenses, amounting to only a little above £1000. How, then, £4000 could have been spent it was hard to make out, unless it were that the Board of Trade themselves, through their solicitor, Mr. Wyatt, incurred large, and he should say almost unjustifiable, expenses in conducting the inquiry. The principal witnesses called by the company were their own salaried servants, and the expenses of the company must have been comparatively few. But even if the total cost were £4000, this board, he thought, should disagree with the request now made, because £4000, in relation to the large transactions of the company, was but a trifle, and the board would not be justified, for the sake of saving £4000 out of a revenue like that of the Chartered Company, in allowing them to inflict a further increase in the price of gas upon the consumers. Taking the annual sale of gas by the Chartered Company £4000 would only amount to about a farthing per 1000 cubic feet of gas, and for the sake of economizing this farthing the board could not assent to the proposed increase of price, or decline to offer the most determined opposition to the application of the company to the Board of Trade. For his part he did not see that the company ought to be allowed to make any increase on the present price; in fact, he objected to the present price being suffered to continue, and thought that, on the contrary, there should be a considerable reduction. He understood from the solicitor that the revision which took place at the beginning of the year, by which the price of gas was increased 7d. per 1000 cubic feet above the maximum in the Act, applied only to the price to be charged during the current year, and that if no second revision took place in January next, the price of gas would revert to the original 3s. 9d. It would be wrong for the board to assent to the price being raised again, for in the course of the last inquiry it was elicited from many of the witnesses—from the witnesses of the board in the strongest possible terms—that this company was the worst managed company in the metropolis. And this fact he thought was proved by circumstances as they existed at the present time. There were companies in London not so favourably situated as this company, nor lighting such large areas, which were supplying gas at a less price, and still paying their statutory dividend of 10 per cent. It was a disgrace to the Chartered Company, with all their facilities, that they could not do the same. In his own district, the Commercial Company, which supplied nearly the whole of the east of London, were supplying gas at 4s., and paying 10 per cent. to their shareholders. Surely, then, the Chartered Company, supplying the whole of the City, and various other districts where the consumption was large and concentrated, with the facilities they possessed in new and extensive works and machinery, might, and, if properly managed, would, be able to sell gas at the same price and to equal advantage. That they could not, he attributed entirely to the wasteful and extravagant management of the company. He was not speaking on his own authority—he would not presume to do that—but in looking through the evidence taken before the commission he found it stated in the most emphatic manner that there was not a company in London, or in the whole of the country, so wretchedly managed as this Gaslight and Coke Company. There was two or three years ago a company called the Great Central Gas Consumers Company, supplying gas partly in his (Mr. Newton's) own district and partly in the City of London. That company were charging 3s. 9d. per 1000 for gas, and were not only paying dividends of 10 per cent., but were year by year repaying, according to Act of Parliament, the defalcations of Mr. Higgs, and accumulating money in addition to that. But that company had been amalgamated with the Chartered Company. He had no hesitation in saying that if they had not been amalgamated, the price charged for gas in the City of London would now be as low as 3s. 6d., and the Great Central Company would still have paid their 10 per cent. dividend. They became amalgamated, however, with the Chartered Company, on the terms of having a preference 10 per cent., which, of course, placed them in a very excellent position. They could not get a higher rate of dividend under any circum-

stances, and, therefore, regardless of the interests of the consumers, they accepted these terms, and entered into the amalgamation. But there were other companies to which he might allude. There was the Ratcliff Company supplying gas at 3s. 9d., the Independent at 3s. 6d., the Phœnix at 3s. 9d. in their town district, and 4s. in the country. If these companies could profitably charge these prices, surely the Chartered could do so. This board, on the suggestion of Mr. Cardwell, who presided over the committee upon the Chartered Company's bill, were the advocates of amalgamation, and they had done their best to promote them, in the hope that they would cheapen management and enable the companies to supply gas at a lower rate. He (Mr. Newton) did not disfavour the question of amalgamation even now, but if anything could cast discredit upon it, and induce the board to insist upon the maintenance of separate smaller companies, it would be the fact that this large company, with a capital of upwards of £3,000,000, and which had expended large sums in the erection of new works, were not able to manufacture gas at the same rate as was found profitable by smaller companies. But he did not attribute their inability to amalgamations; it arose from bad management. It was, therefore, impossible that this board, standing as it did in the face of the public, and representing the interests of the ratepayers and consumers, could agree to any further increase in the price to be charged by this company—or that even the present price should be continued, without the most rigid inquiry, and without the board offering the best evidence they could against their proposal. He hoped the board would be prepared to do that. If not, it was quite clear that the City of London Gas Act, 1868, would be comparatively a dead letter, and the consumers of gas would derive little benefit from recent legislation. He knew that his friend (Mr. Leslie), considered that the Chartered Company were not fairly within the operation of the Act of 1868, as far as concerned their districts outside the City, but in that he was mistaken. If they were not, the company would have no necessity to come before this board and ask their assent to the proposed increase, because, under the Act of 1860, they could raise the price to 4s. 6d. without consulting any one. It was only because they were placed under the Act of 1868 that the Board of Trade could prevent a higher charge than 3s. 9d., unless it was shown that, with due skill and management, they were not in a position to pay their shareholders 10 per cent. This company were entitled to very little favour from the board, because they had many times appeared before Parliament, and latterly with the determination to get relief from some of the provisions of the Act of 1868. It was only by the vigorous opposition of the board that they were prevented from succeeding, and then they withdrew the clause, after putting the board to a great deal of expense. In the session of 1872 they went before Parliament for an increase of £1,000,000 in their capital, and asked for 10 per cent. upon it. The board opposed, and opposed strongly, this proposition, upon the ground that if they were allowed to raise this large sum with a maximum dividend of 10 per cent. attaching to it, it was like presenting their shareholders with £600,000. At that time every £100 of their share capital was worth in the market £160, and their new capital of £1,000,000, raised at the same rate, would be worth to the shareholders £1,600,000. Under these circumstances, the company were not interested in erecting or carrying on their works on the most economical principles, but rather in the expenditure of the largest amount of capital, because the more they laid out, the better for their shareholders. If they could spend £1,000,000, instead of £500,000, it was so much the more in their interest, because they were entitled to 10 per cent. upon it; and as they could go to the Board of Trade, and ask for an increase of price to pay this 10 per cent., they had no incentive to economy and careful management. Gas companies ought not to be allowed to raise new capital with a maximum of 10 per cent. when they could raise the amount they required by loans at 5 per cent., and he might notice the fact that, while this company were authorized to create £1,000,000 of fresh capital at 10 per cent., the Imperial Company were restricted in regard to their new capital to 7½ per cent. This various legislation was a great evil in connexion with the gas question. There ought to be uniformity. The companies should be all treated alike; but under the present system of private bill legislation, one committee took one view, and another a different view, and the result was to produce great mischief. The truth of the whole matter was, that it was time the Metropolitan Board took the entire management of these companies in the interests of the consumers, and to prevent any increase in the price of gas. He saw by the public papers that this question was arousing a strong feeling, and he believed that before the winter was over that feeling would be intensified. The Imperial Gas Company were coming next to ask for an increase; and these two companies represented two-thirds, if not three-fourths of the whole gas manufacture of London, and their example would be sure to be followed by other companies. The board, therefore, were interested in offering to this application the strongest possible opposition. He, for one, did not believe in the reason for an increase in price, as set forth by the company. It was true that coal, the chief material employed by them, had increased in value, but he was certain that it would be found on the inquiry before the commission that the residual products of gas manufacture had increased in value in a more than corresponding degree. He had ascertained from one company that notwithstanding they were paying 6s. or 7s. a ton for coals more than they were paying two or three years ago, the price of coke had risen to more than a corresponding extent, and that the difference between the sale of coke and the purchase of coal was not even now so great as it was two or three years since, when coal was cheaper. If that were so, the board would have a very good ground for going before the commissioners and opposing this application. The gas companies said the price of iron had also increased. But that did not interfere with the ordinary operations in the manufacture of gas. It was only an element for consideration when they were about to extend their works or lay down new mains, which were charges upon capital. As far as revenue was concerned, it made very little difference to them. The Chartered Company made a great point, on the last revision, of the loss they had sustained through the stokers strike. But such an item would not come into the expenditure of the present year, and therefore that element must be discharged from consideration. Upon the whole he certainly thought the company would fail to make out any case before the commission for a further increase of price, and he sincerely hoped they would fail to make out a claim to sustain the present price.

Mr. Watkins seconded the motion, and said he thought the public would be very thankful to the board for their intended opposition. The parish of St. Pancras, which he represented, had received a notice from the Imperial Company that they also intended to go for a revision of price, and that they would terminate all contracts with their consumers at the end of the year. On the previous day the vestry received a large deputation of ratepayers on the subject, and they had determined to call a public meeting to consider what should be done under the circumstances. It was stated that the necessity for the increase in the price arose out of the advance in the price of coal. But coal was coming down in price, while the value of coke was maintained. Two or three years ago he had bought coke from the Imperial Company at 6s. and 8s. a chaldron, whereas the price now charged was 32s. or 33s. In Manchester for the last ten years the supply of gas had been in the hands of the corporation, who had gradually reduced the price for 20-candle gas from 5s. 6d. to 3s. 1d., and during the ten years they had made profits amounting to £624,532, which had gone in reduction of local rates. He hoped the time was not far distant when the great question of the supply of gas in the metropolis—and also the supply of water—would be taken in hand by this board.

Mr. Leslie had no hesitation in saying that outside the City of London the gas consumers had nothing whatever to do with the Act of 1868, and in this opinion he was supported by the Court of Queen's Bench and the Court of Exchequer Chamber, both unanimously. He hoped this board would not go before the revision commissioners, but find some way to bring the question before the judges of the land, and get a decision as to the rights of the parties. The board were quite under a mistake to suppose there were three commissioners on the last revision—there were only two, Mr. Reilly, employed by the Board of Trade, and Dr. Odling. Mr. Pattison was employed to assist them, but was not a commissioner, although he signed the report. What did the board think of the following piece of evidence? In the month of February this year the Chartered Gas Company purchased 150,000 tons of Londonderry coal at 27s. per ton, to be delivered—when? By September, 1874; securing by that very fact to bring them before the revision committee again. Then they bought at the same time 120,000 tons of New Pelton coal, to be supplied in the same period, at 28s. and 29s. Now this was not to come into operation till next year—and Mr. Reilly and Dr. Odling knew it, for it was brought before them—and it was done to keep up the price of gas until the year 1874. The board were using the same coal at Crossness at 4s. per ton less. He did not wish any one to do more than read these two facts. How could the board think of going before a commission constituted like that? Dr. Odling was employed by all the gas companies of London; he was not a fair and proper judge. Let the board get the question before Her Majesty's judges; they would decide according to law. There was one more remark he had to make, incidental to what Mr. Newton had been saying. The average price of coal used by the Chartered Gas Company during the first half of the current year, according to their own accounts, audited by Mr. Parkes, was £1 3s. 6d. per ton. The residual products per ton amounted to 10s. 9d., reducing the cost of the coal carbonized to 12s. 9d. per ton. With these few observations he would leave the matter, and not anticipate the remarks he should hereafter have to offer on the subject of amalgamations, which, though Mr. Newton approved of, he believed had been the ruin of the gas companies.

Mr. Dresser Rogers said he did not know whether Mr. Leslie was right as to the non-application of the Act of 1868 to the districts supplied by the Chartered Company outside the City of London, but the fact existed that the Government had allowed this year an investigation to be made by a commission appointed under that Act, upon the demand of the company for an increase in price in all parts of their district. All that was past and done with, and what the board had now to consider was, whether or not they should oppose the intended second application for an advance. He was glad to find that the gas question was assuming a national aspect, and, thanks to the gas companies themselves, attention was being forced to the consideration of the supply of gas being undertaken by corporate bodies. He regretted that there had been a want of proper attention to this question in the past. The gas companies, however, had been wise in their generation. They had seen for the last ten years that the time was coming when corporations and local boards would take their profits from them, and they had carefully conserved their own interests meanwhile. They had been to Parliament and obtained authority to make large increases in their capitals, which would ultimately become a heavy charge upon the general body of gas consumers, and present a serious difficulty in the way of the ratepayers purchasing their undertakings. The longer that public bodies went on paying little or no attention to the proceedings of these companies, the more they would have to pay for their interests hereafter. He had no hesitation in saying that if a motion, which he made in the Common Council ten years ago, had been carried, thousands upon thousands of pounds might have been saved to the ratepayers of the City. In his own district in the south of London there would be no increase in the price of gas. That district was supplied by the South Metropolitan Company, who were charging a much lower price than in any other part of London. He knew that the Chartered Company did not start fairly with the South Metropolitan and Ratcliff Companies, which were the best managed companies in London. The most extraordinary thing at the present time was this, that against all the theories of those persons best competent to give an opinion, it was a fact that the smallest gas companies in the metropolis—companies which were almost toy undertakings compared with the Chartered and Imperial Companies—were manufacturing gas at a lower price, and obtaining much more for their residual products than the larger companies. He regretted that his voice would not be able to be heard in this agitation, but he was glad that the agitation was coming on. The largest parishes in the metropolis were beginning to awaken to their interests and duty in the matter. Manchester had proved to them that gas could be supplied by corporate bodies at a profit to the ratepayers, and therefore without any ill-will to gas companies, or the slightest desire to sacrifice their interests, he insisted that boards like this must take the question into their own hands.

Mr. Freeman said gas shareholders and directors of gas companies were but men, and it was in accordance with the dictates of human nature that they should seek to conserve their own interests. It was the duty of this board to seek to improve the tribunal before which such questions as this came. At the present time one parliamentary committee were prepared to give gas companies 10 per cent. on their capital; another would cut it down to 7½. There was no justice in this state of things, and it was a pity that these questions had to be decided by such committees. With reference to the question now before the board, he thought the Works Committee had well advised them that they ought to fight the battle to the utmost. The district which he represented was largely interested in the matter, and they were fully prepared to support the board. The question of an anticipated expenditure of £4000 was a mere bagatelle when such considerations were at stake. It was all very well for the vestries to talk about this board taking over the gas and water companies. They did agree to do so years ago, but immediately the vestries came forward to oppose them, and the board were obliged to give up the idea at that time. He hoped it would now become a real settled conviction and opinion that on every ground the gas and water supply of this great metropolis ought to be managed by some central authority, and be no longer left in the hands of private companies.

The motion was then put and carried.

At a later period of the day Mr. Leslie moved, in accordance with notice, a resolution to the effect—"That this board resolve to prepare for immediate action, either offensively or defensively, against The Gaslight and Coke Company, either in equity or law, to compel that company to carry out the Metropolis Gas Act, 1860, outside of the City of London, in the way the judgment of the Metropolitan Board may determine as most effectually to ensure a better and cheaper supply of gas to their constituent ratepayers, and a riddance of the grasping effects of amalgamations and mismanagement." The resolution was prefaced by a long series of statements tending to show that the company had not fulfilled their obligations under the Act of 1860, the mover appearing to be forgetful of the fact that the company's Act of last session contains a special clause amending the defect in the Act of 1868, which led to the litigation with the parish of St. George, Hanover Square, a year or two ago, and declares that the 110th section of the Act of 1868 shall be read and construed as though the words "the Metropolis Gas Act, 1860," were omitted therefrom.

The motion was seconded, but on a division was negatived.

At the meeting on Friday, Dec. 12, a letter was read from the vestry of Marylebone, enclosing the report of a committee appointed by that body to consider the proposed increase in the price of gas, the recommendations of which committee had been unanimously adopted by the vestry. The report stated that they fully appreciated the opposition of the Metropolitan Board of Works to the proposed increase in the price of gas by The Gaslight and Coke Company, and further recommended that this board should be requested to

enter into the inquiry to be instituted on the intended application of the Imperial Gas Company, of which that company had given notice.

Mr. NEWTON moved that the communication be referred to the Works and General Purposes Committee, and said that the proposal of the Imperial Gas Company to raise the price of gas was not before the board at the present time, and he did not think it would be before January.

Mr. LESLIE said that at the last meeting of the board a letter was read from the Imperial Gas Company.

Mr. NEWTON replied that that letter was not the formal one required by the Act, and the committee had deferred the consideration of the question until an application was made by the company to agree with them in the increase on the price of gas.

Mr. LESLIE said that the letter was a notice to this board that the company would cease the supply of gas on the 31st of December, if the communication was not answered.

Mr. SELWAY rose to order; and

The CHAIRMAN said that Mr. Leslie's remarks were hardly pertinent to the question.

Mr. NEWTON, in reply, said that, although this matter might be referred to the committee, they would be incompetent to deal with it until the Imperial Gas Company had applied to them in the proper manner.

The motion was then agreed to.

Mr. LESLIE moved a long resolution, the effect of which was that the solicitor be called upon, at the next meeting of the board, to give an opinion as to the legality of the award of the Board of Trade Commissioners in April last, authorizing an increase in the price charged by the Chartered Gas Company, and to ascertain from the minutes of evidence whether the commissioners took into consideration the question of the effect of the amalgamations entered into by that company; also whether, in the event of their not having done so, the consumers in the Chartered district have not a ground of action against the company for "the illegal demands made by them."

The motion was seconded by Mr. HALL, and agreed to.

COURT OF COMMON COUNCIL.

At the Meeting of this Court, on the 11th inst.—the LORD MAYOR in the chair,

The TOWN-CLERK read a letter received from The Gaslight and Coke Company, stating that a further increase in the price of gas is necessary to meet the extraordinary expenses of 1874, and provide for payment of the company's authorized dividend, and inquiring whether the corporation is disposed to agree with an alteration in price, in pursuance of the 70th section of the City of London Gas Act, 1868.

Mr. DRESSER ROGERS moved that this communication be referred to the Gas and Water Committee. After the good work which that court had done, he was certain that they would not allow any question of expense to come between them and the interests of the consumers. The attitude assumed by the gas companies was arousing public opposition against those gigantic monopolies. He hoped the action of the court ten years since would be taken up again, and that ere long the corporation and other local bodies would have the charge of the gas and water supply.

Mr. SHAW seconded the motion.

Mr. BONTEMS said the opposition that was offered by the corporation and the Metropolitan Board of Works on the occasion of the last commission was the means of saving the consumers 5d. per 1000 feet, which meant £25,000 altogether.

Mr. BEDFORD said the combined expense of the corporation and the Metropolitan Board of Works in regard to the late commission did not amount to one-fourth of £4000.

The CITY SOLICITOR said the largest proportion of the expenses must have gone into the pockets of the company's witnesses, who were mainly their own officers, and also their counsel, one of whom was a director of the company. He suggested, however, that the committee should not be instructed to report, but to take such steps as they thought fit.

Mr. DRESSER ROGERS: I will add the words, "with power to act."

This was agreed to.

A letter was also read from the Imperial Gas Company, intimating their intention to apply to the Board of Trade for a revision of the price now authorized to be charged for gas supplied by them, and further giving notice that they will cease on the 31st of December next to supply gas to the Metropolitan Cattle Market and Columbia Market under the existing agreement.

On the motion of Mr. DRESSER ROGERS, this communication was referred to the Markets and Cattle Markets Committee, with power to confer and co-operate with the Metropolitan Board of Works.

A member having suggested that the committee should manufacture their own gas for the purpose of lighting the markets,

Mr. RUDKIN said that matter would, no doubt, receive due consideration at the hands of the committee.

WHITECHAPEL DISTRICT BOARD OF WORKS.—At the meeting of this board, on the 1st inst., the clerk read a letter from the Metropolitan Board of Works, with a copy of a communication addressed to that body by the Chartered Gas Company, as follows:—

Sir,—It having become evident to the directors that a further increase in the price of gas is necessary to meet the extraordinary expenses of the year 1874, and provide for payment of the company's authorized dividend, I am instructed to inquire whether the Metropolitan Board of Works is disposed to agree with the company as to an alteration in price in pursuance to the 70th section of the City of London Gas Act, 1868. It may be within your knowledge that the inquiry, which very properly was held at the commencement of the current year before commissioners appointed by the Board of Trade, cost upwards of £4000, the whole of which has to be borne by the consumer.

(Signed) J. O. PHILLIPS, Sec.

Mr. Newton said that the price which the company were originally empowered to charge for gas was 3s. 9d. per 1000 feet, but about a year ago they alleged that in consequence of the enhanced cost of coal and labour this was insufficient, and they applied for power to increase the charge to 4s. 9d. A commission was appointed by the Board of Trade to investigate the matter, and in the result the company were permitted to raise the price to 4s. 4d. per 1000, being an advance of 7d. The directors now asserted that a further increase was necessary, and they had accordingly applied to the Metropolitan Board, which was the local authority, for its consent to this step being taken. The matter was referred to a committee, who had reported against granting the application. The question was one of great public importance, especially as the Imperial Gas Company had also given notice of their intention to apply in January next for power to increase their charges. It appeared exceedingly strange that the Commercial, Ratcliff, and other small companies, should be able to supply gas at 3s. 9d., and that a large and rich corporation like the Chartered could not do it for 4s. 4d. He contended that a probable expenditure of £4000 ought not to stand in the way of the matter being thoroughly investigated before a proper tribunal, and that the Metropolitan Board of Works would be wanting in its duty to the public if it consented to the wishes expressed in the letter just read without putting the directors to the proof that an increase of price was necessary. Mr. Munro moved that a letter be sent to the Metropolitan Board of Works requesting them to oppose the application of the Chartered Company to advance the price of gas. The motion having been seconded, Mr. Ilsley moved as an amendment that the Metropolitan Board be requested to protect the consumers. Mr. London seconded the amendment, which was after some discussion negatived, and the original motion carried.

PADDINGTON VESTRY.—At the meeting of this vestry on the 2nd inst., a report was brought up from the Gas and Water Committee, upon a reference made to them as to the advisability of adopting the average meter system with the lighting of the public lamps, and also as to the cost of carrying out that system. The committee stated that they had found, from extensive data collected by them as to the modes of measurement adopted at Nottingham and other towns, that the average meter system had invariably worked well, and that the same could be put into good working order exclusive of engineer's expenses, at a cost not exceeding £6 18s. for every twelfth lamp. The number of meters required for the parish would be 140. They had every reason to believe that by the vestry taking upon themselves the entire control of the lighting of the parish, including repairs and maintenance of the lamp-columns, a considerable saving in the lighting rates would be effected—sufficiently large that they hoped to be enabled at the end of the first year's operation to pay for the cost of inaugurating the system. The committee submitted that under an experiment of the dry meter test, authorized by the Highways Committee, a less amount of gas had been registered than the quantity (5 feet per hour) agreed to be furnished by the gas company to the parish. At a recent interview with the Imperial Gas Company, the directors fully recognized and admitted to a deputation of the committee the validity of the order of the Government referees, and the committee had every reason to believe that the system prescribed by the referees would accomplish what the vestry had so often desired—viz, the purchase of the gas by measurement in a convenient manner, and with justice both to the parish and the Imperial Gas Company. With a view to the adoption of this system as early as possible, the committee submitted for the approval of the vestry the following recommendation:—

That, at the termination of the existing contract with the Imperial Gas Company, the gas supplied to the public lamps in the parish be measured by a meter to be attached to every twelfth lamp, the average consumption of the whole of the lamps to which the meters are attached to be taken to represent the average consumption to each public lamp supplied; and that the lighting and extinguishing of the lamps, and the cleaning and repairing them, including the columns, be done by the vestry, either under a separate contract, or by men employed for the purpose, and that an officer, to be designated "Inspector of Public Lighting," be specially appointed to supervise such work, at such a salary as the vestry may hereafter determine.

Mr. Miller moved the adoption of the report. Mr. Flood seconded the same, and it was unanimously adopted, and upon a further motion, the matter was referred to the Gas and Water Committee for them to carry out. A notice from the Imperial Gas Company of their intention to apply to the Board of Trade for a revision of price, and a letter from the Metropolitan Board asking the opinion of the vestry in reference thereto, was referred to the Gas and Water Committee for consideration. On the application of a vestryman, it was resolved to grant the use of the vestry-hall for the purpose of holding a public meeting, to agitate against the proposed advance in price of the Imperial Gas Company.

ST. PANCRAS VESTRY.—At the quarterly meeting of this vestry on the 3rd inst., the circular letter from the Imperial Gas Company, intimating their intention to apply to the Board of Trade for a revision of price, was read. Three deputations of ratepayers and gas consumers attended the vestry on this subject. The spokesman of the first deputation (Mr. Gore), who described himself as an old gas engineer, said the objection to the proposed increase of price was that it would only go to make up the interest on an exorbitant capital. The Imperial Gas Company had a much larger capital than was necessary to supply the district with gas. The amount of capital invested in gas companies for the supply of gas for the metropolis generally was 9½ millions sterling, and about one-half of this sum was invested in two companies—the Imperial and the Chartered. The amount of capital belonging to these two companies was sufficient to supply gas for the whole of London. The South Metropolitan Gas Company had only a small, but a sufficient capital, and they were enabled to pay the statutory dividend, and supply gas at 3s. per 1000 feet. If the capital of the Imperial Gas Company corresponded with that of the South Metropolitan, it would only amount to £1,600,000, instead of £2,300,000, and thus they would not require to make such large profits in order to pay their dividends. What was supposed to be 14-candle gas was but little better than 12½. He unhesitatingly declared, as a practical man, that in reality the manufacture of gas had not advanced a step in the way of improvement for 25 years. On those grounds the deputation wished the vestry to oppose the application of the company before the Board of Trade. Mr. Antill on behalf of the second, and Mr. Farris on behalf of the third deputations, addressed the vestry, the latter presenting copies of resolutions passed at a public meeting on the previous evening upon the subject. It was then moved by Mr. Kingston—"That the vestry call a public meeting of gas consumers to take into consideration the threatened increase in the price of gas by the Imperial Gas Company to its consumers, and that a committee be formed to carry it out." Mr. J. Watkins seconded the motion. He said the question had been before the Metropolitan Board of Works, and by them referred to a committee, who had agreed to recommend that any proposition to increase the price of gas should be opposed. He did not think the companies would meet with great favour when they made their application to the Board of Trade. He hoped the time was not far distant when local bodies would take up the great question of the supply of gas and water to the metropolis. In Manchester the corporation supplied the gas, and he understood that they had been able to pave nearly the whole of the city with the profits derived from the sale of gas to private consumers. Mr. Mackaness informed the vestry that the Manchester Corporation had just made an increase of 4d. per 1000 cubic feet for the city, and 6d. per 1000 outside. The resolution having been carried, it was resolved, on the motion of Mr. Westacott, that a memorial be sent to the Metropolitan Board of Works representing the views of the vestry, and that it be referred to the General Purposes Committee to draw it up.

KENSINGTON VESTRY.—At the meeting on the 3rd inst., on the reading of the letter from the Chartered Gas Company to the Metropolitan Board announcing their intention to apply for a revision of price for 1874, Mr. Freeman stated that the Metropolitan Board would strenuously oppose the advance, in the interest of the ratepayers. On the motion of Mr. Flood, it was resolved—"That it be referred to the Works, Sanitary, and General Purposes Committee to consider and report as to the desirability of applying the average meter system to the public lamps in the parish of Kensington."

ST. PANCRAS GUARDIAN BOARD.—At the weekly meeting of this board on the 4th inst., a letter was read from the Imperial Gas Company, forwarding notice of intended application to the Board of Trade for a revision of the price of gas. Mr. Salter moved that a reply be sent, stating that the guardians would offer their most strenuous opposition to the proposal before the Board of Trade. This was seconded and carried, and it was also agreed that the views of the guardians should be sent to the Metropolitan Board of Works in order to strengthen their hands in any opposition they might make, and also that a communication should be sent to the Board of Trade asking them to inform the guardians as to when the gas company were going to make their application, so that the guardians might appear to oppose by counsel or otherwise.

MARYLEBONE VESTRY.—At the meeting on the 4th inst., a letter was read from the Metropolitan Board, forwarding copy of a communication from The Gaslight and Coke Company on the subject of an increase in the price of their gas, and from the Imperial Gaslight and Coke Company, stating that they are about to proceed, under the Gas Acts, for power to raise their price of gas during the ensuing year. Professor Marks asked what would be the consequence if the

Board of Trade refused to assent to the increase of the price of gas. The Clerk said the prices would remain as at present, and the company pay the costs. Professor Marks considered the ratepayers owed a debt of gratitude to the Metropolitan Board for the manly way in which they had met this question. He moved that this vestry petition the Board of Trade not to assent to the prayer of the gas companies. The motion having been seconded by Mr. Wilson —in answer to an inquiry, the Vestry Clerk said the Board of Trade, on the application of the gas company, would be bound to appoint three commissioners to inquire into the subject, and fix a price which would allow the shareholders 10 per cent. profit. Mr. Galsworthy thought the question had better be left in the hands of the Metropolitan Board of Works, the members of which were well acquainted with the subject. After some further discussion, Professor Marks, in place of his former motion, moved that the letters which had been received be referred to a special committee for consideration and report. He hoped the time would come when the public would no longer have to depend upon companies for such essential things as light and water. Mr. Emmery seconded the motion, to which Mr. Galsworthy, in accordance with the views he had expressed, moved, as an amendment, that the Metropolitan Board of Works be requested to use its own discretion as to making a voluntary settlement with the Chartered Gas Company, but that it watch the inquiry called for by the Imperial Gas Company, and take such steps as might be deemed necessary. The amendment was eventually withdrawn in favour of the original motion, which was adopted, it being understood that Mr. Galsworthy's proposal might very well be brought forward after an inquiry by the committee. At a meeting of the vestry on the 11th inst., the committee thus appointed made a report in which they recommended the vestry to express their appreciation of the earnestness and ability with which the Metropolitan Board of Works have taken up the question, and that they approve of the intention of the board to oppose the applications of the Chartered and Imperial Gas Companies for authority to increase the price of gas. The committee further recommended that the Board of Works be requested, if the opposition to the proposed increase should fail, to consider whether it would not be advisable to take measures for the repeal of existing Acts of Parliament regulating the dividends.

St. James's (Westminster) Vestry.—At the fortnightly meeting of this vestry on the 4th inst., the question of the proposed application by the Chartered Gas Company, for a revision in the price of gas, was considered, and Mr. Bidgood (a shareholder in the company) suggested that the vestry should pass the following resolution:—

That this vestry confidently hopes that the Metropolitan Board of Works will not agree to any increase in the price of gas, as set forth in the communication from The Gaslight and Coke Company transmitted to the vestry, and that they will take such steps in relation thereto as they may deem practical.

Mr. Downs, in seconding the motion, said he could not understand why the Legislature, with the assent of the corporation and Metropolitan Board, could have allowed the gas supply of the greater part of the metropolis to pass into the hands of one company, as they did by sanctioning the amalgamation schemes. He hoped that authority would be given to introduce a competing company, so that the public would not be at the mercy of one company any longer. Mr. Bidgood said the only true remedy was to supply themselves; the gas and water supply ought to be in the hands of the ratepayers. Mr. Bradshaw remarked that whatever questions affecting the gas supply were brought forward, both the Legislature and the Metropolitan board seemed to think that the companies were the only parties whose interest should be taken care of. The motion was put and carried.

Islington Board of Guardians.—The question of the proposed application of the Imperial Company to the Board of Trade was before the guardians of this parish at their meeting on the 4th inst., but no action was taken in the matter.

St. George's, Hanover Square, Vestry.—At the meeting of this vestry on the 4th, it was resolved, on the motion of General Sir William Codrington, seconded by Mr. Thornhill, to send a letter to the Chartered Gas Company and the Board of Trade, stating that the vestry decidedly objected to any increase in the price whatever.

Islington Vestry.—At the meeting of this vestry on the 5th inst., the Clerk read the notice given by the Imperial Gas Company of their intention to apply to the Board of Trade for a revision of the price of gas. A communication was also received from the Board of Works, stating that a similar notice had been received from the Chartered Gas Company. Mr. Hillman said the companies in their letters talked a great deal about the increased cost of making gas, but nothing about the increased amount obtained for the products. In answer to Mr. Smith, Mr. Bontems said the Metropolitan Board of Works had only authority to represent the consumers in the case of the Chartered Gas Company. With regard to the Imperial Company, the vestries would have to act for themselves. Mr. Price moved that a special committee, consisting of the chairmen of the permanent committees, with Mr. Bontems added to their number, be appointed to consider the matter. Mr. Smith seconded the motion. Mr. Cufflin said they were in the hands of the companies, and would always be so until the supply of gas and water passed into the hands of the people. The very system on which the charges at present were made was so absurd that it seemed preposterous to him that it should ever have been allowed. The companies were to be as extravagant as they liked, have 10 per cent. dividend, and then the consumers were to have the benefit of what was left, if there was any. Such a system led to careless management as a matter of course. The very fact that a company on the south side of London was able to sell gas at 3s. was sufficient proof that there was extravagance on the north side. Mr. Reddish denied the accuracy of the statement that the gas companies were paying 10 per cent.; a great number of the shareholders were only receiving 7 per cent. As to the statement that there was no control over the expenditure, that was not correct, for a public auditor was appointed, and it was his business to see that everything was correct; and the Board of Trade had no power to increase the price of gas, unless they were satisfied that there had been due care in the expenditure. It was too much the fashion to cry down all sorts of companies, and if this sort of thing were to go on the public could not expect companies to devote their capital to the public benefit. He did not think there was any gentleman present who would be satisfied with less than 7 per cent. profit, and at the present time very few gas shareholders got more than 6 per cent. As to the difference in price referred to, they must distinguish between the Imperial Gas Company, which supplied a scattered district, and a company that supplied streets of shops. Mr. Stonelake could not understand why some companies should only charge 3s. 4d. per 1000 cubic feet while others charged 4s. He was positive, from his own experience, that there was no difference in the light supplied at the different prices. He thought they ought to combine in an opposition to the companies. Mr. Price said that, as there were two parties to the bargain, he did not think they must accept altogether the value set upon the gas by the sellers. He questioned whether it would be well for the vestries to undertake the manufacture of their own gas, as he believed that the expense of their doing so would be greater than they anticipated. The case of Manchester could not be referred to as affording a parallel for London, as in the former city they were close to the pits from which the coal was obtained; but he did think the gas companies might hold out a little longer. The committee might well take into consideration the question of combining with the other vestries of the metropolis. The resolution to appoint a committee was adopted, and Mr. Price's name added to the committee, as well as Mr. Bontems's.

Hackney Vestry.—At the meeting of this vestry on the 5th inst., Mr. Robinson directed the attention of the vestry to the circumstance that some of the metropolitan gas companies had announced their intention to apply for permission to raise the price of gas. The subject was one of great interest to the public if any action in regard to this matter had been decided upon by the proper local authority. The chairman said the matter had not yet been brought under the notice of the District Board of Works, but most probably it would come before that body at its next meeting, and no doubt such action would be taken as might be deemed necessary for the protection of the public interest. Mr. Robinson gave notice that at the next meeting of the vestry he would submit a motion upon this subject for consideration. Mr. F. Cox quite agreed that proper attention ought to be given to this matter, and he thought they might rest assured that this would be done. Notices had been served upon the City authorities by several companies of their intention to take proceedings with a view to raising the price of gas, and the corporation were in communication with the Board of Works, which was constituted the local authority for the metropolis upon the matter, so that there was every reason to believe that a very strong opposition would be offered to the movement. The applications of the companies would have to be dealt with by commissioners appointed by the Board of Trade, and if it could be shown that in consequence of the enhanced price of coals and labour, which were the reasons assigned for the proposed rise, the demands of the directors were just, no doubt they would be conceded. Without question, however, a very searching inquiry would be made, and if the applicants failed to establish their case they would meet with a refusal. In the case of the Chartered Gas Company, their present price was 4s. 4d. per 1000, and it was the opinion entertained by many competent persons that even the Board of Trade Commissioners would not be able to authorize a rise of more than 2d. in that instance. Should the directors desire to increase the price beyond 4s. 6d. per 1000, it was contended they could not do so unless they first obtained further powers from Parliament. It was extremely desirable that all the local boards in the metropolis should have an opportunity of expressing their views upon this important subject, and he cordially approved of the notice of motion that had been given. Mr. Game said it was true that the price of coal had risen considerably, but it was falling again, and therefore that could scarcely now be advanced as a reason why the price of gas should be increased again. The residual products from the manufacture of gas were much more valuable than they formerly were, but this was a circumstance which the directors of the companies did not appear desirous of making known. He thought that the greatest vigilance should be exercised to prevent any unnecessary increase in the price of gas. The subject then dropped.

Bethnal Green Vestry.—At the meeting of this vestry on the 4th inst., the clerk having read the circular letter of the Imperial Gas Company, stated that unless the vestry gave notice to the contrary it would be understood that they agreed to an increase. After some discussion, it was resolved that the clerk ascertain by the next meeting what steps the Metropolitan Board of Works intended to take in the matter, and that a communication be forwarded to the clerk of that board that, in the opinion of the vestry, it was desirable to oppose any increase in the price of gas.

Holborn District Board.—At the meeting on the 8th inst., the chairman (Mr. Hall) informed the board that the Metropolitan Board had determined to oppose the Imperial Company in their application to the Board of Trade, and the question was referred to a committee to consider in what way to support this action.

Westminster District Board.—The Chartered Gas Company having made a claim for damages occasioned to their mains by the steam roller employed by this board, the Works Committee reported at the meeting on the 12th inst., that, after consultation with the solicitor, they were of opinion that it will be advisable to discontinue the use of the steam roller for the present, and that a copy of the letter of The Gaslight and Coke Company on the subject be forwarded to the Metropolitan Board.

Meeting at Exeter Hall.—The "Gas Consumers Association" secured the services of Mr. W. H. Smith, M.P., as chairman of a meeting on the 2nd inst., in the small room, Exeter Hall, "To protest against the present high price of gas, and to urge the desirability of taking the gas supply of the metropolis out of the hands of the gas companies." The honourable member was careful to intimate, at the outset of the proceedings, that he was present in compliance with a requisition from a number of his constituents. He had no interest in the question, which would probably form matter for legislation, and he should reserve his judgment until it came before him in his capacity of member of Parliament. After listening to an address from the "secretary," the meeting adopted a resolution to the effect—"That the Metropolis Gas Act, 1860, and the City Gas Act, 1868, were measures calculated to perpetuate the monopoly of the gas companies, and ought to be repealed, and that it was advisable that the gas supply should be in the hands of the local authorities; also that an application should be made to Parliament, in the ensuing session, to give effect to the resolution, and that meetings should be held in furtherance of the object.

Dr. Stevenson's reports on the quality of the gas supplied in St. Pancras, during the months of October and November state that during the month of October the maximum illuminating power of the gas supplied by the Imperial Company at the testing station, No. 10, Edward Street, was 15·2, the minimum 13·5, and the average 14·4 standard sperm candles. The gas was of about the usual quality. Of impurities, ammonia was always present in small quantities; sulphuretted hydrogen was never detected. Sulphur, in all forms, was present to the extent of 17·90 grains per 100 cubic feet. In November the maximum illuminating power was 14·9, the minimum 13·9, and the average 14·5 standard sperm candles. The illuminating power was slightly in excess of that recorded during the preceding month. Of impurities, ammonia was always present, though never in excessive quantity; sulphuretted hydrogen was never detected; whilst sulphur in various forms was present to the amount of 19·64 grains per 100 cubic feet.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone:—

November, 1873.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon.in 100 Cu. Ft.	Sulphuretted Hydrogn.
	*Mean of 23 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas	16·98	18·30	16·00	22·25	10·71	20·99	0·66	None.
Chartered Company's common gas. . .	16·85	17·90	15·91	27·40	14·22	16·81	0·53	None.
Chartered Company's cannel gas . . .	20·73	21·20	20·22	19·73	11·72	25·57	0·93	None.

Mean of daily readings of barometer. . . . 29·69
" " " thermometer . . . 56·16

* Each observation consists of ten readings of the photometer, at intervals of one minute.

During the month the mean illuminating power of the Imperial Company's gas has been equal to the light of 17 candles; it ranged between 18·30 and 16 candles; six times it exceeded 18 candles. The mean amount of sulphur in 100 cubic feet of this gas was 20·99 grains, and of ammonia 0·66 of a grain. The mean light of the Chartered common gas was nearly equal to 17 candles; it

ranged between 17·90 and 15·91 candles; once only was it below 16 candles, and six times it exceeded 17 candles. The mean quantity of sulphur found was 16·81 grains, and of ammonia half a grain. The mean light of the cannel gas was equal to nearly 21 candles, it ranged between 21·20 and 20·22 candles. The legal standard of illuminating power of this gas was originally 20 candles, some two or three years ago it was raised to 23 candles, and within the last two or three months it has been again reduced to 20 candles. The sulphur found in 100 cubic feet of this gas was 25·57 grains, and of ammonia a little less than one grain. The pressure of all the gases was at times low, and complaints have been made to me by several householders in the parish of the insufficiency of their gas supply. Till within the last few months the pressure of the gas supplied by the Chartered Company during the evening amounted generally to between 3 and 4 inches; now it hardly ever reaches 3 inches, and usually is as low as 1½ or 2 inches. On no occasion was sulphuretted hydrogen detected in either of the three gases by the ordinary tests. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas manufactured at their works, Beckton and Bow.

METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following returns of the average daily quantity of water supplied by the London water companies, for the month of October, 1873. Thus, according to their account, 115,326,807 gallons, or 523,982 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight) were supplied daily; or 227·7 gallons (103·4 decalitres), rather more than a *ton* by weight, to each house, and 32·1 gallons (14·6 decalitres) to each person.

Companies.	Number of Houses, &c., supplied in Oct., 1872.	Oct., 1873.	Aver. Daily Supply of Water in Gallons* during Oct., 1872.	Oct., 1873.
Total supply	499,786	506,595	108,373,227	115,326,807
From Thames	233,457	237,894	56,384,676	60,846,270
„ Lea and other Sources	266,329	268,701	51,988,551	54,480,537
Thames.				
Chelsea	28,247	28,395	8,564,100	8,339,700
West Middlesex	43,992	45,157	9,249,174	9,393,704
Southwark and Vauxhall	79,017	79,508	16,459,907	19,494,676
Grand Junction	33,500	34,718	10,948,495	11,153,290
Lambeth	48,701	50,116	11,103,000	12,464,900
Lea and other Sources.				
New River	120,592	121,774	24,672,000	25,901,000
East London	104,196	104,481	20,623,600	22,289,525
Kent	41,541	42,446	6,692,951	6,290,012

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for October, 1873, as compared with that for the corresponding month of 1872, shows an increase of 6809 houses, and of 6,953,580 gallons of water supplied daily.

Dr. Frankland, F.R.S., reports that the quality of the water delivered during November by the metropolitan companies drawing their supplies from the Thames was greatly inferior to that delivered in the previous month. It contained in solution a large proportion of organic matter, some of which was of animal origin. Taking the amount of organic impurity contained in a given volume of the Kent Company's water as unity, the proportional amount in an equal volume of water supplied by each of the other metropolitan companies was—New River, 1·7; East London, 2·7; Grand Junction, 3·0; West Middlesex, 3·5; Southwark, 4·2; Lambeth, 4·7; and Chelsea, 4·9. The water distributed by the Chelsea and Lambeth Companies, and by the Grand Junction Company in a lesser degree, was polluted by suspended matter, owing to inefficient filtration; this suspended matter abounded, in all cases, with living and moving organisms. The water abstracted from the river Lea by the New River and East London Companies was considerably superior to Thames water, and it was efficiently filtered before delivery.

Dr. Whitmore's report on the composition of the Thames companies and other waters as supplied in Marylebone:—

November, 1873.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by incineration of Solid Matter in previous column.		Hardness before boiling in degrees.	Hardness after boiling in degrees.
	Nov., 1872.	Nov., 1873.	Nov., 1872.	Nov., 1873.		
	0°	0°	0°	0°	0°	0°
Distilled Water						
West Middlesex water	18·96	19·52	0·86	0·80	13·14	3·02
Grand Junction water	19·00	19·88	0·88	0·92	13·52	3·20

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

The water supplied to the parish during the month by the West Middlesex Company has been, as it almost invariably is, clear, bright, and well filtered. That supplied by the Grand Junction Company has, at times, been slightly turbid, owing apparently to inefficient filtration. The organic matter has been slightly in excess in the water of both companies.

MANCHESTER (CORPORATION) GAS SUPPLY.

A Meeting of the Town Council was held on Wednesday, Dec. 3—the Mayor (Alderman Watkin) presiding.

The Gas Committee presented the following report in reference to the proposed increase in the price of gas:—

Report.

The Gas Committee present the following report to the council, supplementary to that presented on the 1st day of October last,* in relation to the proposed advance in the price of gas:—

On Sept. 4, 1867, your committee were directed by the council to report "what course it may be desirable to take to secure for the ratepayers an amount of profit equal to 10 per cent. per annum on the amount of their capital employed in the manufacture of gas.'

The circumstance which led to the consideration of that important question in the council was the general falling off that had taken place in the amount your committee were enabled to pay over for improvement purposes out of the profits derived from the gas-works, such amount being for the year ending June 24, 1867, only £13,257 8s. 5d.

At the period referred to, your committee were and for some time past had been engaged in making, at considerable cost, important extensions and improvements in the works, but which could not for some time to come be fully developed and brought into use, and consequently a portion of that outlay was unproductive.

Your committee, after frequent meetings at which the subject of the resolution referred to received most anxious consideration, were of opinion that, rather than recommend the council to advance the price of gas in order to meet the deficiency in the amount of profit, it was desirable to wait for the full development of the extension and improvements in the works, by which it was believed that any advance would be rendered unnecessary. Your committee therefore reported to the council on March 4, 1868, as follows:—

"In compliance with the resolution of the council of September 4 last, your committee have carefully considered 'what course it may be desirable to take to secure to the ratepayers an amount of profit equal to 10 per cent. upon the amount of their capital employed in the manufacture of gas.'

"As the cost of the materials used in the manufacture and the value of the residuary products vary from time to time, it is not possible to secure each year a uniform rate of profit. During the last eight years, notwithstanding that several reductions have been made in the price charged for gas, the profit has slightly exceeded an average of 10 per cent. per annum upon the capital employed, and your committee have reason to believe that, when the large extent of new plant in course of construction at both stations has been brought into full operation, the same rate will be maintained upon the average of any short series of years. If, however, these expectations should not be realised, it will then be necessary for the council to adopt the only remaining method by which the amount of profit can be increased—namely, that of advancing the price of gas.

"Whilst it is obvious that such is the only mode by which the gross profit can be immediately increased to 10 per cent., your committee do not at present deem it desirable to recommend its adoption, being of opinion that the deficiency will prove to be only temporary. In order, however, that the amount applicable to improvement purposes may not be subject to the fluctuations experienced in former years, your committee recommend that a sum be paid over each year to the Improvement Committee equal to that to which such committee would be entitled if a gross profit of 10 per cent. upon the capital employed were obtained.

"Provided this arrangement is sanctioned by the council, it is estimated that the Improvement Committee will receive in respect of the current year the sum of £25,000, or thereabouts, and will for a time continue to receive a larger sum than the amount of the gross profit, as exhibited by the statement of accounts, will appear to justify. It is proposed that the balances so overpaid shall be carried to a suspense account, the amount of which your committee anticipate will be recouped to them by the additional profit realised when the extensions now in progress are completed, and the whole of the outlay has by the natural increase of business become productive."

That report and the recommendation therein contained were approved of by th council, and from that time have been acted upon by your committee.

The results anticipated may be said to have been fairly realized, so long as the then conditions as regarded the cost of the materials and labour remained undisturbed.

During the year ending the 24th of June, 1868—the first financial year affected by the new arrangement—your committee found it necessary to supplement the amount earned by £13,059 8s. 5d., in order to make up the required surplus on the basis of 10 per cent.; in the year 1869, £11,303 19s. 8d.; in 1870, £3750, making a total of £28,113 8s. 1d. In the following year, however, instead of increasing the amount so advanced, your committee were enabled to repay themselves £5922 1s. 2d., leaving the balance owing £22,191 6s. 11d., which your committee had then good reason to believe would be repaid out of the extra profits of the next two or three years.

Shortly after this period, unfortunately, the advances in the prices of materials and labour began to be felt, and notwithstanding the favourable position which your committee had been able to assume with regard to their contracts for cannel and coal, it has been necessary still further to supplement the surplus payable for improvement purposes—in the year 1872 by £13,293 10s. 3d., and in 1873 by £16,641 11s. 6d., thus increasing the amount advanced in anticipation of future profits, so as to meet the required return of 10 per cent. upon the capital employed, to £52,126 8s. 8d., which your committee firmly believe would not have been the case in the absence of the great advances in the cost of materials and labour, and which amount your committee see no means of returning to their capital except by the aid of the council.

It is under these circumstances that your committee have resolved to recommend the council to sanction the following advances in the price of gas—viz.:

To the consumers within the city, 4d. per 1000 cubic feet. To the consumers beyond the city, 6d. per 1000 cubic feet.

For the gas supplied to the public lamps within the city, from 30s. to 35s. each lamp per annum. For the gas supplied to the public lamps beyond the city, from 35s. to 42s. 6d. each lamp per annum. Such advances to commence from the 25th day of December next.

By the revision of the charges now recommended, your committee estimate that the financial position of the department, on the 24th of June next, will be as is shown in the following statement:—

Estimated Profit, 1873–4.

Gross profit for the year 1872–3		£63,603 0 0
Deduct—		
Probable extra cost of cannel and coal upon an estimated consumption of 193,000 tons—say, 2s. 6d. per ton		24,125 0 0
		£39,478 0 9
Add—		
Extra receipts from the sale of coke	£7,875 0 0	
Extra receipts from the last advance of 2d. per 1000 cubic feet in respect of the last September quarter	1,725 0 0	
Extra receipts from the last advance of 5s. per lamp upon the public lamps within the city in respect of the present half year	970 17 6	
Extra receipts from the proposed advance of 4d. per 1000 cubic feet within the city for the half year ending June 24, 1874	9,880 0 0	
Extra receipts from the proposed advance of 6d. per 1000 cubic feet beyond the city for the half year ending June 24, 1874	3,628 0 0	
Proposed advance of 5s. per lamp within the city for the half year ending June 24, 1874	1,000 0 0	
Proposed advance of 7s. 6d. per lamp beyond the city for the half year ending June 24, 1874	365 0 0	
		25,443 17 6
Estimated gross profit for the year 1873–4		£64,921 18 0
Capital, assuming no increase upon 1872–3		802,446 10 1
Deduct—		
Amount advanced to the Improvement Committee in anticipation of future profits	£35,484 17 2	
Two-thirds the value of the land in Lower King Street, in the occupation of the Watch Committee	4,500 0 0	
		39,984 17 2
Estimated capital, June 24, 1873		£762,461 12 11
Ten per cent. on estimated capital	£76,246 3 3	
Estimated gross profit	64,921 18 0	
Estimated deficiency	£11,324 5 3	

Alderman King moved that the recommendations in the report be adopted.

Alderman Lamb seconded the motion.

Alderman Bennett asked whether it was probable that coals and cannel would maintain their present prices. It was his impression that they were likely to come down in price, and therefore he urged upon the committee that it would be better to postpone the question until next spring. He thought the committee might have raised the price of gas outside the city, and kept down the price with respect to those inside the city, who had to pay heavy taxation. He moved as an amendment—"That the price of gas be 5s. per 1000 feet outside the city, and that the price within the municipal boundary remain the same as at present.."

Mr. W. G. Bennett seconded the motion.

Mr. Croston opposed the amendment, and pointed out that even if the rates proposed by Alderman Bennett were adopted, it would leave a large deficiency at the end of the year.

Mr. Price opposed the motion, and suggested that Alderman Bennett should withdraw his amendment in favour of one postponing the question until the Equalization of Rates Committee had made their report.

Alderman Bennett withdrew his amendment in favour of Mr. Price's amendment, which latter was seconded by Mr. Harwood.

Mr. Anderton supported the motion, and said that the delay of the question would cost the corporation £10,000.

Alderman Grundy deprecated delay. If the proposal was carried out for the equalization of rates, it could not take effect for two years; therefore, it could have very little bearing on the gas question at present.

On the question being put to the vote, the report of the committee was adopted by a majority of 33 to 16.

Alderman Bennett proposed to restrict the increase of price to June next, but the motion was negatived.

* This report and the statements of accounts for the year ending in June are in type, and we hope to find space for them in the next number of the Journal.

GLASGOW (CORPORATION) GAS SUPPLY.

At the Monthly Meeting of the Glasgow Town Council, held on the 4th inst.—the Lord Provost in the chair—the Gas Committee reported that the Board of Trade had granted to the corporation a Provisional Order authorizing an increase in the price of gas from 4s. 7d. to 5s. from the 1st inst. The committee had, after full deliberation, resolved to recommend that on and from the 1st day of December, 1873, the price to be charged for gas supplied by the corporation, and consumed by meter, should be 5s. 5d. per 1000 cubic feet.

Mr. Miller, in moving the adoption of the committee's minutes said he would lay on the table for the inspection of members the estimate on which the recommendation that the price of gas should be increased was founded. He might say generally that it was estimated that this price of 5s. 5d. per 1000 feet would, in the first place, defray the total loss upon the past year, amounting to £11,7[illegible]; and if the consumption of gas went on increasing as they expected it, at the rate of 5 per cent. per annum, there would be a balance of £3367 13s. That estimate made no allowance for improvements and economy in the manufacture of gas, which might very probably arise after the Dawsholm works were in operation. That, however, was problematical, and it would be wrong in the committee to fix the price in expectation that any saving would thus take place; but 5s. 5d. per 1000 feet would pay off the deficit and leave a reversion of £3367. There was one point, however, to be taken into consideration—namely, that they had made the charge for depreciation at the same rate as last year. Many members of council took exception to their reducing the rate of depreciation to 1 per cent., and certainly it was done against his opinion, as he thought it was most desirable that they should reduce the capital cost of their works as speedily as possible. There was a sufficient margin as the estimate was framed, but if they reverted to the rate of depreciation of former years, the whole of this £3367 would be taken up, and a good deal more. Mr. Ross had prepared a statement of the principal items that went to make up the increase. The first was the item of coals, which, compared with the year 1871-72, showed an increase of a fraction over 12d. on the 1000 feet. The interest on borrowed capital was a fraction over 2d. per 1000 feet. There was a large proportion of their capital at present unproductive in consequence of the large extension of the works. Then the deficit last year amounted to a fraction over 2d., and there were several other fractional sums for parliamentary charges, sinking-fund, and sundries. Taking the other side, there was a reduction in depreciation of 1d. per 1000 feet, and on sundries of about 2½d., so that when the decrease was deducted from the increase, a balance of 14½d. was left. It would be observed further that the increased price of 5s. 5d. did not commence till December, and that up till that time the charge had only been 4s. 7d.

Mr. Torrens seconded the motion.

Mr. Findlay thought that a considerable saving might be effected in the cost of the stair lights if the standard were reduced to 2½ inches.

The Chairman said the suggestion would be considered by the committee.

Bailie Bain said, to enable the council to form an intelligent opinion on the subject, it would be wise that this statement just presented should be printed and circulated. It was matter of remark, and would require to be investigated yet, that while Glasgow was situated in the centre of a large coal district, with the finest gas coal in its immediate neighbourhood, yet the consumers had always to pay a high price for their gas, compared with Birmingham, Liverpool, and Manchester. He moved that the statement now laid on the table be printed and circulated.

Mr. Mackenzie seconded the amendment, and observed that at Birmingham the price of gas had only just been raised from 2s. 9d. to 3s.

Mr. Osborne said that on a former occasion Mr. Foulis had explained that the reason why the price of gas in Glasgow was comparatively high was that it had double the illuminating power of the gas in those English towns. In Birmingham the illuminating power of gas was only 12 candles, whereas in Glasgow it was 26. Mr. Foulis said that if they would allow him to make gas of 14 candles illuminating power, he could do so cheaper that it was made in Birmingham.

Mr. Waddell said that if they looked at the price of gas in Edinburgh, Dundee, and other large towns in Scotland they would find that it was higher than in Glasgow.

Mr. Mathieson said that in Edinburgh the price of gas was 6s., in Leith 6s., in Ayr 7s. 6d. per 1000 feet, and in very few places in Scotland was it less. If any one were to observe the gas in Manchester, Birmingham, or Liverpool, they would see that it was not so good as ours.

Bailie Bain: It is better; your illuminating standard is no standard.

Mr. Mathieson: Then it is the duty of the magistrates to see that the standard is kept up to the proper illuminating power.

Bailie Bain said he looked upon the arguments of Mr. Mathieson as to the price of gas in other Scotch towns as no criterion. There was no town in Scotland so favourably situated as Glasgow for having cheap gas, and, having so large a population, they should be able to produce it at much less cost.

The minutes were then approved, and the statement ordered to be printed and circulated among members.

BELFAST TOWN COUNCIL.

PROPOSED PURCHASE OF THE GAS-WORKS.

The Monthly Meeting of the Belfast Town Council was held on Monday, Dec. 1—the Mayor (Mr. J. A. Henderson) presiding.

The Law and Police Committees presented the following joint report:—

Your committees report that they have had under consideration the draft of the bill for carrying out the agreement lately entered into with the gas company for the purchase of the gas-works, and have settled its provisions so far as they could do so.

It provides for the confirmation of the purchase on the terms agreed on—the transfer to the council of the company's works, property, powers, &c., and the dissolution of the company.

It gives borrowing powers on mortgages, debenture stock annuities, or current account of funds for payment of the purchase-money and outstanding liabilities of the company, and provides capital for the carrying on and extension of the works. The moneys so borrowed to be charges upon the income, &c., of the works, and the police-rate to be collateral security therefor.

If any payment be made in respect thereof out of the police-rate, the amount of such payment shall be repaid in the following year out of the gas-fund, and, if necessary for that purpose, the price of gas raised.

It also provides for the setting aside, after the first two years, of a sinking-fund of 1 per cent. per annum on the capital, such sinking-fund to be applied in repayment of the money borrowed, so as gradually to extinguish the debt.

A separate account is to be kept of the receipts and payments in connexion with the works; and the council may appoint a Gas Committee, and delegate to them such of their powers as may be deemed advisable.

It limits the maximum price of gas to 5s. 6d. per 1000, subject to the allowance of discounts to consumers, and alters the minimum standard of quality of the gas to be supplied to 16 candles, with Sugg's London Argand burner, No. 1.

The surplus profits in any year in which the average price of gas shall not exceed 3s. 9d. per 1000 feet may be applied to public purposes.

Other provisions necessary for the carrying out of the purchase, and to enable the corporation properly to carry on the works, are embodied in the draft bill; but it is not considered necessary to refer to them in detail.

Your committees hope that, when such amendments or modifications as the parliamentary agents may deem requisite and the rules of Parliament require, have been made in the draft bill, it will embody the powers required by the council to enable them efficiently to carry on these important works for the benefit of and with advantage to the town. And they recommend that they be authorized to take all necessary steps to promote the bill.

A statement in connexion with this matter, submitted to the council at their quarterly meeting on the 1st of November by several gentlemen connected with the Falls Road district, has been under the consideration of your committees. Those gentlemen complain—

1. Of the illuminating power of the gas supplied by the company being deficient;
2. They request that the gas consumers shall be made to bear all the expenses connected with the purchase, and the manufacture of gas; and
3. That the council shall agree to insert clauses in the bill to enable individual consumers or associations of consumers to erect other gas-works in the borough.

As to the first suggestion, your committees have to report that the standard of quality prescribed by the gas company's Acts is 14 candles, and that the bill provides one of 16. This involves the supplying of an average quality of fully 17 candles, so as to preclude the possibility of its getting below the prescribed minimum standard. It should also be borne in mind that the higher the quality of gas is, the greater proportionately is the cost of its production, and the less return there is from residuals. Your committees, therefore, are of opinion that it would not be judicious to fix a higher standard than 16 candles; but should it afterwards be found desirable to supply gas of a higher illuminating power, there is nothing in the bill to prevent that being done.

As to the second suggestion, the bill provides for the gas-works being self-supporting; and, as to the third suggestion, it was never intended that the bill should deprive individuals of any right which they now possess. Your committees cannot understand how any one who had considered the question could propose that, after the works have been purchased by the town for the benefit of the community, the council should offer facilities for the erection of other gas-works to compete with those so purchased; and this would be still more unreasonable, having regard to the provision that all the expenses connected with the purchase and manufacture are to be borne by the gas consumers.

To adopt the proposition would be to offer to any number of the inhabitants a right to separate their interests in the gas-works from those of their fellow-townsmen, and to throw on the latter the onus of maintaining the works, and paying off the debt incurred in making the purchase. Such a proposition could not be entertained.

Mr. D. Taylor moved the adoption of the report, which was seconded by Mr. Thompson.

Dr. Whitaker said he had always objected to the purchase of the gas-works at such a large price—22½ years purchase—and also on the ground that he believed a number of private individuals could manage a concern of the kind better than a corporation; for it was scarcely to be expected that three or four gentlemen of the corporation, who knew nothing about the manufacture of gas, could carry on the works as advantageously and economically as those who devoted their entire attention to it; and his third reason was that they had quite enough to do already in attending to the improvements of the streets of the wards and the other necessary works of the corporation. He saw by another report that was to come up that they were about to take steps to have the water supply of the town in their own hands. That was a question he thought fully ripe for consideration, and of a different class altogether from the manufacture and sale of gas. He believed, however, that as honourable men they were committed to the purchase now, and he would offer no factious opposition, but would assist his brother corporators in having the clauses which he thought wrong amended. The maximum price at present which could be imposed is 4s. 6d., while by the proposed bill the maximum price would be 5s. 6d. Now, he observed that it was proposed that any profits on the price of gas at 3s. 9d. may be devoted to public purposes. He thought such profits should be allowed to accumulate to defray any deficiency which might arise in other years.

Mr. Carlisle thought the works ought to be in the hands of the corporation, and that they were bound to carry out the arrangements with the company.

Sir John Savage, referring to Dr. Whitaker's remarks, expressed an opinion that the terms of purchase were as reasonable as possible. As to the supposed liability which the acquisition of the works would entail on the police-rate, he remarked that the undertaking would be entirely self-supporting, and if any deficiency arose it would be met by an increase in the cost of gas.

Mr. Gaffikin said the gas-works ought to have been in the possession of the council some 20 years ago, but it was not too late yet to take them up. Last year the gas company wished to increase their capital by £100,000. If that had been allowed it would have given them a greater hold on the town, and would have been a great disadvantage to the ratepayers. He considered that they took a wise step last session in what they did with respect to this matter. He was opposed to interfering in any shape with the rates of the town, and the way that clause had been moderated quite satisfied him. He wished to know whether the corporation would allow the same discount as was allowed by the company.

The Mayor said they would. It would not be right to alter it, having been in existence so long.

Mr. Greenhill said he did not coincide in the opinion that a private company necessarily worked with greater economy than a corporation. They had it from Mr. Stevenson that much greater economy might be exercised in the manufacture of gas at Belfast, but that where there being such a surplus of revenue there was not the inducement to economize which there would be were it difficult to earn their dividends. The value of the works to the corporation might be learned from the fact that, instead of the extensions being charged to capital in the ordinary way, some of them had been paid for out of revenue; and, as Mr. Stevenson pointed out, had the loans been capitalized, and 23½ years purchase demanded upon the statutable dividends, instead of asking £403,000, the demand would have been £694,000. It must also be borne in mind that these works were now capable of producing 50 per cent. more gas than was at present manufactured. With regard to the economical structure of the works, it was worth knowing that the capital of the company was £630 for every million feet of gas sold, whilst that of the company at Dublin was over £1000. Perhaps one of the most decided advantages of the corporation getting hold of the gas-works would be that for the cost of the various extensions which, as a matter of course, took place in a growing town like Belfast, the corporation could get the money at 4 or 4½ per cent., instead of as at present paying 7 per cent. to a foreign company.

Mr. Lindsay supported the proposition, because he thought that the price to be paid was fair, and that the corporation were right in becoming the owners of the gas-works. The time had come when no foreign company should possess powers such as the present gas company possessed over the streets of Belfast, and in connexion with the supply of such a commodity. He objected, however, to one clause in the report: "The surplus profits in any year in which the average price of gas shall not exceed 3s. 9d. per 1000 feet may be applied to public purposes." He thought that any surplus should go to the benefit of the gas consumers, and not to the general ratepayers. If any one would move the omission of it he would second the motion.

Mr. Dinnen having long taken a deep interest in this question, and so long ago as 1870 moved a resolution in the council for acquiring the gas-works, expressed himself perfectly satisfied with the reasonableness of the proposed terms of purchase. With reference to the last remark made by Mr. Lindsay, he said the gas consumers only numbered some 16,000. He did not see why they should derive the exclusive benefit of the purchase. He referred to Manchester, where similar profits were applied to public purposes. He would oppose this bill, and at once sever himself from the promotion of it if the gas consumers were to derive the sole benefit.

Mr. Biggar protested against the purchase, and remarked that in Glasgow the gas-works had been purchased by the town on 10 per cent. better terms.

Mr. Hart was perfectly satisfied with the way in which the company had supplied the town, and thought the works would be more economically managed by them than by the corporation. He opposed the purchase, and thought the corporation would only get themselves into trouble by taking the concern into their hands.

The Mayor thought the statements of the last speaker were likely to mislead the public, and called upon the town-clerk to state the facts with reference to the purchase of the Glasgow works. As to the comparative economy in the management of the undertaking, he denied that the advantage would be in favour of the company. The company were away in

Leicester, and only came twice a year to see the works, whereas a committee of the corporation would see them every day.

The Town-Solicitor said the Glasgow Corporation bought the capital of the company that was paying 10 per cent. dividends, with perpetual annuities of 9 per cent., and also bought the capital that was paying 7 per cent. with perpetual annuities of 6¾ per cent. Taking these rates of perpetual annuities upon the capital of the Belfast Company, the corporation in Belfast would have to pay £15,880 a year, whereas, by borrowing £386,000 at 4 per cent., they would only have to pay £15,440 a year. There was thus a saving of £400 a year in favour of Belfast.

Dr. Alexander thought that, in addition to a sinking-fund, there should also be a depreciation-fund, and that all the surplus profits beyond should go to the gas consumers, by whom the profit was provided, except, perhaps, 1 per cent. to the police-rate, which was the security.

Mr. Bingham was opposed to the purchase, and referred to the Corporation of Limerick, who had lost £30,000 by their works, and were now anxious to get rid of them.

Mr. Jenkins concurred with Mr. Lindsay in believing that any profit arising from the purchase of the gas-works should go to the gas consumers.

The motion for the adoption of the report was then put, and carried with four dissentients.

ON CARBURATION.

By Wm. H. Wahl, Ph.D.,

Editor of the Journal of the Franklin Institute, Philadelphia, U.S.A.

A committee of the Franklin Institute was specially appointed some time since to ascertain the causes of conflagrations, and the best methods of their prevention. To this committee, Dr. Wahl, the secretary of the Institute, has made an elaborate and exhaustive report on the light petroleum oils, considered as to their safety or danger in various domestic uses. From this report we extract the following remarks on carburation:—

Continuing the consideration of the modern innovations in the field of illumination, certain methods, by which the light oils of petroleum (gasoline especially) are made use of, to improve the illuminating power of ordinary burning gas, warrant attention. These processes are essentially the same in principle, though differing very greatly in the details of the devices in carrying out the idea; and when carried into effect, with certain obvious precautions, which will be referred too hereafter, are, to some extent, though by no means entirely, free from the vital objections on the score of danger, upon which so much stress has been laid in the preceding pages of this report. And the writer begs leave, once for all, to state his firm conviction, that it would prove a matter of inestimable benefit, if some method should be discovered and applied, either for converting these volatile bodies into useful and harmless compounds, or if some process should be devised for utilizing them largely in the industrial arts. By either of these remedies the direct employment of the light oils for household illumination could be altogether avoided; since, though the ingenuity of invention may be exercised to devise preventives and precautions against accident with them, it is very gravely to be doubted, from the very nature of the materials, whether they can ever be so employed with a reasonable degree of safety.

The philosophy of the processes here referred to will be more clearly understood by a general reference to the principles involved in the utilization of illuminating agents. These are generally compounds of carbon and hydrogen, the so-called hydrocarbons, and are either already in the gaseous state, or are converted to this condition in the process of burning. A certain proportion of these elements is, however, necessary, in order that the illuminant shall burn with proper brilliancy. To the hydrogen of the burning body is to be mainly ascribed the heating power of its flame, while to the carbon alone are we indebted for its illuminating qualities. It is, therefore, possible that a hydrocarbon may possess too much hydrogen in proportion to its per centage of carbon (as is the case with the light carburetted hydrogen, for example), when the effect will be that of a hot flame, but almost or entirely blue, and with little or no light-giving power. Or, on the other hand, the burning body may contain an excessive proportion of carbon (as in the case, for example, with turpentine oil), when the result will be a dull red, dirty, smoking flame, which, though giving out more light than the first, is utterly objectionable on the score of the abomination of its smoke. It is, therefore, a matter of the first importance that, in an illuminant, these essential constituents shall be present in such proportions as shall produce the best illuminating effect.

With the common burning gas, the reason of its very general inferiority is to be referred to the large per centage of the light carburetted hydrogen gas and of free hydrogen itself, which it contains. The *rationale* of the introduction of these feeble or non-illuminating ingredients into the gas is not difficult to comprehend if a glance be taken at the operation of its manufacture.

In the process of obtaining burning gas from fat coal, which is the one almost universally employed in gas-works, the rich, light-giving gas is evolved during the earlier portions of the heat; but, owing to the natural desire of the companies to secure from a charge the largest quantity of gas, the heat is continued for a considerable time after the richer portions of the gas have passed off; the consequence of which is, that the gas passed over in the holder during this period is very largely composed of hydrogen, which has no illuminating power, and of the light carburetted hydrogen, which is not much better.

The fact that the gas supplied for household consumption is generally but of indifferent quality, mainly from the cause specified above, has originated a number of plans for improving its brilliancy, by supplying it indirectly with a portion of the constituent in which it is lacking—namely, carbon. This process involves the passage of the gas, before consumption, through a reservoir of some one of the light petroleum oils, preferably gasoline, on account of its eminent volatility; by which treatment it becomes charged to saturation with the vapour of this material, the illuminating power of which is very superior, and comes to the burner greatly improved in quality.

This process, which bears the name of "carburetting," has received, in several cities, a limited introduction. The volume of the gas is by this process considerably increased, as well as its illuminating power: and this, together with the cheapness of the carburetting material, the smaller quantity of gas which need be consumed to produce a given amount of light, as compared with that which would be required without its presence, combine to considerably diminish the expense of employing gas—an item, it must be granted, of no inconsiderable importance in large establishments where a large number of burners are regularly in operation. And it is in such establishments that this plan, or others, which will presently be alluded to, have been received with the most favour.

Where a limited number of burners are in requisition, as in smaller workshops, stores, or private dwellings, the saving which may thus be effected in the item of expense is scarcely a matter sufficiently important to offset the disagreeable routine of attention which it is necessary to devote to the apparatus to keep it in effective operation. Other incidental difficulties, such as the natural hesitation on the part of those familiar with the unavoidable risk entailed upon the handling of the carburetting material, and perhaps the still more cogent reason, that the insurance interests have, in most localities, prudently refused to sanction or permit the introduction of the process, in connexion with risks assumed by them, have so combined to limit the application of the process of carburetting, that it is, though not new, still comparatively unknown to the general public.

Although the introduction of any of the lighter oils of petroleum into buildings for illuminating purposes will be discountenanced by all who seriously and candidly reflect upon the unavoidable risks which attend their employment, it must still be granted that, if these substances are to be employed at all, this and allied plans, in which the inflammable material is securely confined in a metallic reservoir, is infinitely to be preferred to the practice of using them in the lamps or stoves.

In connexion with the modern processes for the utilization of the light petroleum oils, there remain yet to be reviewed a number of plans by which this is accomplished directly; although, through the intervention of appliances considerably more complex than the portable lamps. Reference is here made to the numerous devices which are popularly termed gas machines.

These consist, in general terms, of a reservoir, generally a strong metallic vessel, supplied with the oil to be utilized, through or over which a regulated supply of air (or in some cases of hydrogen) is passed, the illuminating agent resulting from this contact being then led, by the usual distribution-pipes, to the burners. In the simplest form of apparatus operating upon this principle, this result is accomplished by permitting the gasoline vapour, which is considerably heavier than the air, to fall, in virtue of its gravity, down a descending pipe, and thus, by the current established, induce a flow of air over the surface of the oil. The material is suitably contained within a reservoir provided with an opening at one extremity, to permit of the access of the air, and further, with a series of alternating, imperfect partitions. The object of the latter is to increase the amount of contact between the entering air and oil, and to effect what would be equivalent to a large evaporating surface. The more rapidly the gas is consumed from the burners the more rapid will be the evaporating process, which will, of course, cease as soon as the burners are turned off. Thus, by ingeniously taking advantage of the extreme volatility of the light oil, an air-current is induced, by which an abundant supply of excellent illuminating gas is obtained automatically, without the introduction of any appliance other than the reservoir with its simple partitions. This plan, though very interesting, from its simplicity and the scientific principle which it so ingeniously illustrates, involves the serious necessity of placing the reservoir of oil in the upper storey of the building to be lighted. It contains the essential features, though the object is attained in the simplest possible manner, of all the numerous gas machines. In the others, a fan or its equivalent is employed to blow into the reservoir a stream of air. Though somewhat more complex in construction, this form of the apparatus is less objectionable than that first described, from the fact that the reservoir of oil may be located at a considerable distance from the house, and beneath the ground, in a pit prepared for the purpose thus lessening the risk by lessening its proximity to the building endangered by its presence; though, with all of them, the personal dangers attending the replenishing of the reservoir, remain the same, as does also the liability to explosion, when a leakage occurs or from an accidental deficiency of oil in the reservoir, or extremely cold weather, a defect in the proper working of the apparatus, or from any other cause, an excess of air is introduced by the blower. Where such a condition of things occurs, an explosion is the inevitable consequence, since the instant the proper mixture of air and vapour is reached, the combustion of the gas at the burners will dart instantly back to the reservoir with all the explosive violence of gunpowder.

With the hydrogen machine, where a current of hydrogen gas (generated in an appropriate vessel, from the action of diluted sulphuric acid upon iron scrap), is passed through the reservoir of oil, though it seems not to be so liable to an accident from this source, and affords a light much superior to that obtainable with the other forms of machine, is more obviously objectionable, on the score of complexity of the operations involved in its working, not the least of which consists in the replenishing, from time to time, of the generating vessel: an operation which, from the character of the acid and its refuse, is a most disagreeable one. Another objection, however, which far more effectually extinguishes the possibility of this process ever gaining popularity, resides in the fact that the gas obtained by it costs, to say the least, three times as much per 1000 feet as the ordinary burning gas. The sale of the refuse to the manufacturing chemist, for the extraction of the green vitriol, and the diminution in the quantity of gas consumed, by reason of its excellent illuminating quality, may effect a slight reduction in the grave item of expense, but this will, even under the most favourable circumstances, be too great to permit of any other than a very limited introduction.

With this somewhat lengthy consideration, the gas machines may be passed by; though, in conclusion of this branch of the subject, a few words upon their merits may not be thrown away.

They possess, one and all, the objectionable feature of employing the incendiary petroleum oils; and though they, as a class, reduce the danger of its presence to a minimum, by confining the material in a strong metallic vessel, and by locating this at some distance from the buildings to be lighted, the danger from disarrangement or carelessness is but incompletely guarded against, as has already been pointed out, and the personal risk involved in the execution of the routine of attention, which they demand, remains unprovided for.

In the foregoing pages, the entire unfitness of the light petroleum oils has been urged, under whatever name, or with any form of lamp or machine, as household illuminating or heating agents, from the belief that under no circumstances can these substances be so employed without great risk. With the least objectionable modes of their application—namely, in the carburetter and the gas machine, the writer was, until lately, of the opinion that they might, with the exercise of well-defined precautions, be used with a reasonable degree of safety; but a thorough examination, with the knowledge gathered from a more extended acquaintance with the statistics of the subject, have prompted a revocation of that opinion and this expression of it.

There is no field at present in which invention would prove of such eminent service to the community at large as in that of devising methods by which these oils would be utilized upon a vast scale, and thus effect their withdrawal from those applications in which their dangerous qualities are so prominently involved, to the constant peril of life and property. That this object will ultimately be accomplished there can be no doubt. Already large quantities of these materials are exported, to be converted into permanent illuminating gas by a process analogous to that employed in our gas-works, the retort and its setting being modified to suit the purpose. Their utilization in other departments of the industrial arts is gradually extending, and it is sincerely to be wished that the time may be not far distant when the demand for them in these legitimate fields of employment may be more than sufficient to meet the supply. As an indication that progress is being made in this direction, this report, which has grown into far more considerable proportions than was originally intended, may be appropriately concluded by a description of the most recent of all the plans for illumination, and in which the light petroleums are called upon to do good and proper service.

The plan consists of three distinct steps: First, the continuous production of hydrogen gas; second, the passage of the hydrogen through a well of the light oils; and third and most important, the conversion of the vapour-laden hydrogen into a permanent gas.

The first step in this ingenious invention consists in leading steam into a furnace charged with coke and heated to redness, by which process hydrogen and carbonic oxide are formed. From this mixture the carbonic oxide is removed by passing the gases through cylinders of hydrated lime heated to redness. The result of this treatment is the formation of a fresh equivalent of hydrogen, and the conversion of the carbonic oxide into carbonic acid by union with the oxygen of the decomposed water of hydration. The carbonic acid is removed from the hydrogen by passing through more lime, and the hydrogen is passed onward into another chamber, where it comes into intimate contact with a body of light petroleum oil. Here it loads itself with the oil

vapour, and continues on its course, passing next through tubes heated to a low, red heat, whereby a permanent coal gas is formed precisely analogous in all its properties to the ordinary coal gas, though superior to the last (as ordinarily furnished to the public) in illuminating quality.

A process which would secure to those living remote from cities, and who are necessarily deprived of the luxury of coal gas, some substitute for the petroleum gas machine, which shall equal it in the quality of its illuminant, but at the same time shall be free from its objectionable features, would be a more direct means of effecting this much-to-be-desired result, though it affords a problem far more difficult of solution.

Institution of Civil Engineers.—Mr. Nathaniel St. Bernard Beardmore, C.E., of Westminster, and Mr. Samuel Hunter, engineer and manager of the Rochdale Corporation Gas-Works, have just been elected associates of this institution.

Appointment of Meter Inspector, &c., to the Corporation of Dublin.—On the 1st inst., Mr. W. F. Connolly was appointed to fill the office of inspector and tester of gas-meters, inspector of public lighting, and gas examiner, at a salary of £300 per annum. There were four candidates for the office.

Alliance and Dublin Consumers Gas Company.—We understand that the vacancy at the board of the Alliance Gas Company, caused by the retirement of Sir John Gray, M.P., has been filled up by the unanimous election of Mr. David Drimmie, of Sackville Street, who took such a prominent part in the recent reconstruction of the company.—*Irish Times.*

Nictheroy (Brazil) Gas Company, Limited.—The directors of this company announce the issue of £10,000 7 per cent. debentures, redeemable in ten years. These debentures, which are the first and only charge upon the undertaking, are issued for the purpose of completing the extension of the public lighting. At present only £5000 are required, and applications for that amount, in sums of £100, are invited.

Advances in the Price of Gas.—The Glasgow Corporation have resolved to raise the price of gas from 4s. 7d. to 5s. 5d., and the Wrexham Gas Company, under their provisional order, have increased the price from 4s. 8d. to 5s. 2d. At Hamilton, N.B., the charge has been advanced to 5s. 10d.; at Newton, Lancashire, there has been an advance of 3d. per 1000, and a similar advance at Londonderry.

Bury (Lancashire) Gas Supply.—From the annual report of Mr. Wood, the manager of the gas-works in this town, presented on the 3rd inst., at the meeting of the Improvement Commissioners, it appeared that there had been an increase of 6 million cubic feet in the quantity of gas sold during the year, as compared with the previous year, and an increase of 2,750,000 feet on the quarter, as compared with the same quarter last year. The average illuminating power of the gas during the month was set down as 18½ sperm candles; maximum, 19·4 candles; minimum, 17·4 candles.

Dublin (Corporation) Water-Works.—The return of the quantity of water sent into the outlying townships and into the city during the week ending the 26th of November, 1873, gives the following results:—

Average quantity daily sent over Callow Hill Weir	15,213,766 gals.
Average per day sent into the townships . . .	1,499,568 ,,
Average quantity of water sent into the city daily (accounted for)	6,958.256 ,,
Average quantity of water wasted daily	6,755,942 ,,

Hereford (Corporation) Gas Supply.—At the monthly meeting of the Town Council, on the 2nd inst., the Gas Management Committee reported that they had considered the question of the price to be charged for gas, and they did not think it expedient to make any alteration at present. The consumption since the commencement of the financial year had increased so much in comparison with the same period of last year that they anticipated the profit upon this increase would cover the extra cost for production, and they feared that to raise the price at the present time might tend very much to check the consumption.

Hull Gas Supply.—The report of Mr. Baynes, for the month of November, shows that the gas supplied by the British Gas Company in the Sculcoates and Myton district maintained a very uniform and satisfactory standard of illuminating power, the range being only about half a candle. Neither free ammonia nor sulphuretted hydrogen were at any time present to the ordinary tests. The results for the month, with Sugg's standard burner, are—

	Max.	Min.	Mean.
Illuminating power in standard sperm candles	14·90	14·45	14·66
Grains of sulphur per 100 feet	24·60	17·60	22·12
Grains of ammonia per 100 feet	—	—	0·50

Mean barometer and temperature in experiment-room—Bar., 30·06; temp., 57°.

Salford (Corporation) Gas Supply.—At the council meeting, on the 3rd inst., Alderman Platt, in reply to an inquiry, said that the subject of the price of gas had been discussed on many occasions, but he was happy to inform the council that in consequence of the very favourable contracts they had for coal and cannel—some of which contracts would expire next year—it was not in the contemplation of the Gas Committee at present to make any alteration in the price of gas. They might be able to carry on for some months—at any rate over the present winter—before any alteration would be required; and it was hoped that before it became necessary to make any alteration the price of cannel and coal would be lowered.

Sunday Labour in Gas-Works.—A correspondent, writing from Hartford City, Conn., U.S.A., says: "I am pleased to see that the subject of the observance of the Sabbath in gas-works is receiving some attention on your, and formerly my, side of the Atlantic. These works (Hartford City Gaslight Company's), so far as our knowledge extends, are the only works in this country where the Sabbath is observed (except it be to make up a deficiency caused by a small product during the six days of the week—not a very commendable observance). At one works, that of Cambridge, adjoining the city of Boston, they are arranging to try the experiment. We have proved it a success during the past six or eight years."

Suffocation by Gas at Bristol.—An inquest was held on the 29th ult. at the Arno's Vale Convent, in this city, on the body of Mary Boylan, aged 28, who was found in her sleeping-room or cell on the previous Wednesday morning, unconscious and in a partially suffocated state, from which she never rallied. She had been an inmate of the refuge section of the establishment for about 12 years altogether, but she had several times gone out to situations. From one of these she returned on Tuesday night. She appeared in her ordinary health, and went to bed in a small sleeping-room about 9 feet square. There was no fire-grate in the room, and no ventilation. It had a gaslight, and also a gas-stove, the jets of which had been lit to warm the room. It was thought that before going to bed deceased would put these gaslights out. Next morning at six o'clock the room-door, contrary to custom, was found locked, and no reply could be obtained in reply to repeated knocking. The deceased was heard to be breathing heavily, and the woman who went to call her, knowing that Boylan had had a hard day's work the previous day, and must therefore be tired, was not alarmed. She turned off the main-tap of the gas as usual about this time in the morning, and at half-past eight o'clock she still found Boylan's door locked. This state of things continuing till nine o'clock, and no answer being obtainable from within, some of the inmates of the convent went round to the window of the small apartment, and saw Mary Boylan apparently breathing with great difficulty, her face being deadly pallid. They got into the room by breaking the window, and found that the apartment was filled with vitiated air, which was quite overpowering. The heavy breathing of the young woman then ceased, and when the window was open they thought her dead. Mr. Carr, a surgeon living in the neighbourhood, was called in, but Boylan only partially rallied, and died on Thursday, about 27 hours after she was discovered in the state described. The gas-burner was found half on, and the jets in the stove full on, but the gas at the main was turned off two hours before the inmates gained an entrance into the room. The witnesses could not say whether deceased kept the stove jets and the gas-burner alight all night, or whether the gas in the bracket, the tap of which was found on at half force, had been escaping. The coroner (himself a medical man) observed that one theory might be that the stove jets and the burner having been left burning all night in this ill-ventilated apartment, the oxygen in the room was consumed till there was no more to feed the gas, which then went out and escaped, and thus the deceased was being gradually suffocated when discovered. A juryman suggested another theory, that while the stove was kept burning the gas bracket had been turned off by deceased, who inadvertently turned it back on half force again. He would account for an explosion occurring from the gas jets in the stove by pointing out that these were only a couple of inches from the ground, whereas the gas escaping, while it did not quite fill the apartment, would continually rise, and perhaps find some vent through the crevices of the window. Mr. Carr said the symptoms were similar to those he had seen in deaths from charcoal. He had no doubt that death resulted from poisoning by inhalation of the coal gas. The jury returned a verdict of "Accidental death," adopting the view of the medical witness, that death resulted from poisoning by the inhalation of coal gas. The coroner thought the lesson to be learnt from this case was that, in in a small room like that, a gas-stove was utterly inadmissible unless placed in the fire-grate, and he intimated that he had the assurance of the superintendent of the convent that every precaution should be taken in future to prevent the recurrence of so painful an event.

Birmingham Water Supply.—Dr. Hill, the medical officer of health for Birmingham, reports that the water supplied to that town during November was slightly turbid, that the ammonia was diminishing, but that the proportion of organic nitrogen still continued high.

Glasgow Water Supply.—Professor Bischof reports that the Glasgow water supply during the month of November again showed some inferiority of quality, owing, as explained by the engineer, to the use of five miles of new tarred pipe, jointed by means of paint. The water is, however, not unwholesome, and continues entirely free from any evidence of previous sewage or animal contamination.

Hull (Corporation) Water Supply.—At the meeting of the Hull Town Council, on the 4th inst., a committee was appointed "to inquire into the causes which, for several successive years, have made the expenditure of the water-works department of this corporation so largely and increasingly exceed its income; to consider whether this unsatisfactory state of things be in any measure attributable to circumstances under the control of the Water-Works Committee, and, if so, by what alterations in the management which that committee has hitherto adopted it is reasonable to hope that the mistakes of the past may be prevented for the future, and to report to the council the result of their investigation; and to enable the committee to carry out these instructions, the Water-Works Committee, the water-works engineer, and all other water-works officials, are directed, on the requisition of the committee, to produce for their inspection all books, accounts, and other documents connected with the water-works department, and to supply all information with reference thereto which it is in their power to afford; and, in the event of the committee thinking it desirable to avail themselves of the assistance of any person or persons practically acquainted with the management of water-works, the council hereby authorizes them to do so, and for this purpose places at their disposal any amount not exceeding £100. The committee met on the 8th inst., and Mr. Woodhouse, a member of the existing water-works, was elected chairman, and a resolution was passed appointing the chairman, Mr. Witty, and Mr. Elam a sub-committee to prepare points for consideration, and a programme for the next meeting. A resolution was also passed requesting the engineer to furnish a return of the dates of ordering and quantities of coal supplied, when received and how consumed, the return to be for the two years following his appointment. The treasurer's assistant (Mr. Brook) was desired to supply in a tabulated form the amounts expended upon coal, wages, &c., for the two last years of Mr. Marillier's connexion with the works.

Machinery at the Cattle Show.—Messrs. Tangye Brothers and Holman exhibited steam-engines and steam pumping machinery, for both of which they have received the award of the Vienna Medal of Progress. Of the former they showed one of their newly-designed fixed horizontal high-pressure expansive steam-engines, of the type which has worked so admirably in the annexe of machinery in motion at the South Kensington Exhibition for these three years past, and fitted with Tangye's patent governor, combining in small compass a governor, stop-valve, and throttle-valve complete, being simple, compact, and sensitive. This engine is rated at 18-horse power, has a 14-inch cylinder and a 28-inch stroke; larger sizes yet are now being turned out, namely, with 16 and 18-inch cylinders, and 32 and 36-inch strokes respectively. In the larger sizes these engines are frequently coupled, and in the smaller sizes they are combined on one bed-plate with a vertical boiler, offering an excellent type of combined engine and boiler, with various advantages. Many of these engines are in use in gas-works, one of the largest size being in hand for the gas-works at Santiago, Chili. Their "Special" pumps, or direct-acting horizontal steam pumping machinery, are well known, considerably over 3000 of them having been made and sold; the largest sizes yet made have been one of 30-inch steam cylinder, 48-inch stroke, and 8-inch pump, for mines in Siberia, with a capacity of 30,000 gallons per hour, lift 750 feet, and another of 32-inch steam cylinder, 72-inch stroke, and 10-inch pump, for mines in Durham, rated, with 40 lb. steam pressure, at 20,000 gallons per hour. The small sizes are much used in gas and chemical works, especially for pumping ammoniacal liquor. Messrs. Hayward Tyler and Co. exhibited their pumping machinery and other hydraulic appliances; prominent among these was a selection of the patent "Universal" steam pumping-engines, for which a Vienna Prize Medal was awarded at the recent Universal Exhibition. A machine for testing boilers by hydraulic pressure was also among the apparatus exhibited by them.

Register of New Patents.

569.—Patison, J., Airdrie, N.B., "*Improvements in the destructive distillation of coal and shale for the production of illuminating gas, fuel, and oil, and other products therefrom, and in the apparatus therefore.*" Patent dated Feb. 15, 1873.

This invention consists of an improved mode and means of carrying on the permanent or continuous destructive distillation of coal or shale, or a mixture of these with other organic substances, or heated bricks, coke, scrap iron, or other such equivalent, for the production of the products and hydrocarbons for lighting, heating, and other purposes, by feeding the materials to be treated into long cylindrical iron, clay, or other retorts capable of standing the great heat required for the particular gases or vapours being distilled over by them. The retort is laid at an angle with close ends, and has the material to be treated (suitably broken up) charged or fed into a hopper or mouthpiece at the highest

end, fitted with a tapered charging plug and weighted lever, which, when lifted by the operator, admits the charge and again closes the throat when let go. The materials thus charged into the throat may, by a feeding screw fitted in it, be further fed into the upper end of the retort, which is itself fitted with a long screw shaft or shafts, having the screw formed to act continuously by angled radial blades fixed or formed on the spindles, and which, with angled teeth at the upper end, draw in and compress the material through the upper contracted end, and screw it slowly to the far lower end of the retort, loosening and stirring it to free the gaseous products in its course, while the destructive distillation is constantly going on, room being left at the top for their free exit at the highest part from one large pipe or several small ones for their subsequent purification, condensation, or other treatment and use in the usual manner, the residuum and solid carbon being discharged through a closed duct at the lower end into water, or close vessels, or otherwise, for subsequent use in heating the retort, or for other purposes. This apparatus is adapted specially for distilling off the great part of the hydrocarbon compounds at low temperatures from the coal and shale, or their mixture with other substances. Iron retorts may be used and heated in the inside by the admission or injection of superheated steam or other vapours or gases, maintained steadily at the lower temperature until the eliminated gases are exhausted from the material being treated. For the distillation of these substances and their mixtures for obtaining the greatest amount of illuminating or permanent gases, and freeing the residuum of all volatile matter, a much higher steady heat is employed, and the retorts are thus preferably formed of fire-clay or other equivalent, and heated from the outside in a usual manner by fuel or gas heating close furnaces; and in this case it is preferred to lead the vapours generated through highly heated bricks, coke, scrap iron, or other equivalent, in a close chamber or retort, so as to decompose the hydrocarbons, and thus eliminate or produce the greatest possible quantity of the permanent gases desired. The one end of each feeding and conducting screw-shaft would pass out through a fluid-tight stuffing-box in one end of its respective retort, so as to be driven by gearing outside. When by the former distillation (at low temperature) the treatment is not carried on so as to eliminate all the oils from the residuum, these residua could be run off while hot by a pipe and tap for the purpose, at the lowest part of the retort. To use and treat the nitrogeneous liquid products they are neutralized with acids to form salts on evaporation in the usual manner, and to use the hydrocarbon oils these may be distilled, condensed, refined, and purified by acids and alkalies, all in the usual manner; but the crude hydrocarbon oils obtained by the first treatment, or such hydrocarbons obtained from other sources, may by another improvement be heated to 80° or 90° Fahr., and led by pipes controlled by taps, from a suitable heating or other cistern above, through the lower part of the retort and the highly heated residuum therein, so as by a second or double distillation to be decomposed or eliminated into the permanent or illuminating gases desired; and by another treatment this second distillation of the hydrocarbon oils may in like manner be performed or executed in ordinary retorts, as well as in the constant-acting cylinders with feeding and conducting screw-spindles revolving in them. The final solid residuum or carbon obtained from any of these improved processes may subsequently be ground for blacking, or used for charcoal or fuel for heating the retorts, or for other ordinary heating purposes.

591.—HENDERSON, A. C., Charing Cross, "*Improvements in the purification of water and apparatus connected therewith, together with the mode of cleansing the same.*" A communication. Patent dated Feb. 18, 1873.

This invention consists in purifying water before use, either for domestic or industrial purposes, by a combined chemical and mechanical process, freeing it from calcarious and other matters held in solution, by adding thereto a small proportionate quantity of solution of caustic lime, which troubling the water presents a precipitate formed by the action of the carbonic acid by immediately depositing carbonate of lime, so that instead of having to treat matters in solution it merely remains to operate on matters in suspension.

The apparatus for effecting this consists of a filter formed of a cylindrical vertical case of sheet or cast iron furnished with a lid; in this another cylinder is contained which is the filter proper, also formed of sheets of cast or sheet iron, one at the top and the other at the bottom, and united by three concentric cylinders of perforated sheet-iron, these cylinders forming two annular capacities supplied with filtering matter composed of felt or wool rendered impuirescible. The water arrives in the filter by a tap, spreads itself between the envelope and the filtering cylinder, then by pressure traverses the latter, and makes its exit by a discharge-tap perfectly clear and freed from all matters in suspension.

The cleansing of the filter is effected without the necessity of taking the apparatus to pieces, in the following manner:—When the steam-engine is stopped, the tap admitting water into the filter is closed, as well as the exit-pipe communicating with the feed-pump, which allows of free communication with the central-pipe of the filter, and water-draught of the generator. On opening the discharge-tap it will at once be seen what has taken place. The pressure of the generator sends the water already purified into the central pipe of the filter, this water traverses inversely the beds or layers of filtering matter and draws along with it the foreign organic matter arrested during filtration, and flows out by the discharge-tap. The whole cylindrical body is also moveable on a pivot, and is made to revolve so that it comes under the influence of a brush fixed vertically at the inner side of the case, which suffices to dislodge any residue.

656.—CAMPBELL, M., Maryborough, Ireland, "*Improvements in arrangements and apparatus for preparing peat, small coals, coal tar, petroleum, or other similar substances for fuel.*" Patent dated Feb. 21, 1873.

These improvements consist in macerating the peat into pulp by means of suitable mills, without water, or with water, petroleum, or coal tar added thereto; afterwards it is moulded into solid, hollow, or perforated blocks or bricks by passing it through the dies of brick-making machinery. Small coals and coal tar are also mixed together and moulded into blocks or bricks in like manner. The drying-shed is heated artificially, and ventilated by a self-acting screw cowl fitted on top of shed.

686—BOLTON, F. J., Westminster, and WEBBER, C. E., Kensington, "*An improved method of obtaining photometric measurements, and apparatus for that purpose.*" Provisional protection only obtained. Dated Feb. 24, 1873.

This invention relates to a method of and apparatus for obtaining photometric measurements in terms of electrical measurement. A body, of which the electrical conductivity or resistance is altered by exposure to light, is placed in an electrical circuit, in which circuit is also placed an electrometer or gauge of electrical resistance. Light is directed on the body, and the value of this light, or the transparency or density of any translucent substance through which the light is passed is tested by the effect on the electrometer or resistance gauge.

704.—CHAPPELL, T., Finsbury Park, Middlesex, "*Improvements in the manufacture of gas.*" Provisional protection only obtained. Dated Feb. 25, 1873.

The specification of this invention describes manufacturing gas for lighting and heating purposes from an artificial material composed of petroleum, petroleum spirit, paraffin oil, or any other suitable oil or spirit, combined with chalk, chalkstone, clunch, or other suitable earthy matter:

712.—HOEY, T., Glasgow, "*Improved arrangements or apparatus for preventing waste of water in connexion with water-closets, and for facilitating the utilization of excremental matters, and their exclusion from ordinary drains.*" Patent dated Feb. 26, 1873.

In this improved arrangement a measuring compartment is fitted or formed in the cistern supplying the closet, and has a small inlet-valve, and a larger discharge-valve, the latter communicating with the flushing-pipe. The connexion to the inlet-valve is of such a relative length as to close the inlet-valve before the discharge valve begins to open, and a spring is interposed to allow the motion of the lever to continue after the inlet-valve is closed. Below the discharge-valve of the measuring compartment there is a small chamber from which, in addition to the ordinary flushing-pipe, there is a branch-pipe fitted with a stopcock, and leading into the overflow-pipe from the cistern. The overflow-pipe is not led in the ordinary way into the soil-pipe, so that the leakage or overflow water will not be wasted or go to increase the dilution of the excremental matters; but in the case of a series of closets in different flats of a house, the overflow-pipe of each cistern above the lowest is led into the cistern of a lower closet, whilst that of the lowest is led into the drain or sewer, being at the same time provided at any convenient point with an opening or other arrangement admitting of inspection. Each waste or drain-pipe may have a small branch-pipe inserted into or across it, so as to intercept and receive a small proportion of whatever liquid is passed down, such branch-pipe leading into any convenient receptacle, which may be enclosed so as to be accessible only to an official inspector.

729.—GLOVER, J., Seckforde Street, Clerkenwell, "*Improvements in parts of dry gas-meters.*" Patent dated Feb. 27, 1873.

In the arrangements as generally adopted for the passage of the gas into and from the measuring compartments of dry gas-meters sliding valves are employed, so arranged with the passages or gratings thereof that the opening and closing of them takes place simultaneously the whole length of their passages, by which both the opening and closing of such passages is sudden, often producing unsteadiness of the lights.

The object of this invention is to remedy this evil by obtaining a gradual opening of the length of these passages or gratings. For this purpose the openings or gratings are formed across the valve-seats in an inclined direction, so that the flow of the gas into as well as from the measuring compartments, as well as the closing of such passages, commences at one end of the length of each opening, and progressively along that side, and so on until the passage is fully open or closed.

In place of the inclination being given to the openings or gratings in the valve-seats, it may be given to the parts of the valves; and in place of the sides of the passages in the seats or the parts of the valves being simply inclined in a direction from one end to the other, a corresponding effect may be obtained by the openings or parts of the valves to act therewith being of a curved or other form admitting of the progressive opening and closing in the sliding motion of the valve.

APPLICATIONS FOR LETTERS PATENT.

3795.—KENYON, R. W., Accrington, "Improvements in taps or cocks." Nov. 21, 1873.
3796.—RAMSDEN, J. C., Lightcliffe, Yorks, "Improved apparatus for generating steam, economizing fuel, and utilizing the gases arising from the combustion thereof." Nov. 21, 1873.
3803.—TRUEMAN, H. P., Pentonville, "Improvements in apparatus for measuring liquids." Nov. 21, 1873.
3807.—ROSS, W., Glasgow, "Improvements in apparatus for supplying and regulating the quantity of water." Nov. 22, 1873.
3822.—HAWKINS, J. G., Gas-Works, Sheffield, "Improvements in apparatus used in the manufacture of gas." Nov. 22, 1873.
3833.—GREEN, B., Plaistow, Essex, "Improvements in storing and treating sewage." Nov. 24, 1873.
3843.—WIRTH, F., Frankfort-on-the-Main, "A new method of introducing burning gas into melting-furnaces, and in the apparatus employed therefor." A communication. Nov. 25, 1873.
3848.—LAKE, W. R., Southampton Buildings, London, "Improvements in gas-engines, and in apparatus for producing gaseous mixtures to be used in the same." A communication. Nov. 25, 1873.
3850.—ROBINSON, A. H., Dublin, "Improvements in meters for measuring water or other fluids." Nov. 26, 1873.
3868.—PARKER, J. F., and WADE, A., Birmingham, "Improvements in the process of and apparatus for the manufacture of coke and illuminating gas." Nov. 26, 1873.
3900.—FISKEN, W., Stanfordham, Northumberland, "Improvements in apparatus for heating or warming buildings, also applicable for cooking purposes." Nov. 28, 1873.
3902.—MORTON, R., Stockton-on-Tees, "Improvements in refrigerators or apparatus for cooling liquids, parts of which improvements are also applicable to distillation, surface condensation, heating or cooling fluids, air, or gases." Nov. 29, 1873.
3910.—BELL, J., and BELL, R., Wishaw, N.B., "Improvements in utilizing the waste heat of materials employed in retorts, and in the apparatus or means employed therefor." Nov. 29, 1873.
3916.—UNDERHAY, F. G., Clerkenwell, and CARTER, A. E., Notting Hill, "Improvements in apparatus for preventing waste of water." Nov. 29, 1873.
3931.—BEAUFORT, W. M., Piccadilly, Middlesex, "An improved method of making joints." Dec. 1, 1873.
3939.—MOORE, B. T., Isleworth, Middlesex, "Improvements in water and other meters." Dec. 1, 1873.
3953.—PAGET, F. A., Adelphi, London, "Improvements in the mode of and apparatus for softening and purifying water." A communication. Dec. 2, 1873.

GRANTS OF PROVISIONAL PROTECTION.

3526.—HARRISON, C. W., High Holborn, "Improvements in the manufacture of gas, and in the apparatus employed therein." Oct. 30, 1873.
3607.—SOUL, M. A., Leadenhall Street, London, "Improvements in self-lighting gas apparatus." A communication. Nov. 6, 1873.
3628.—NUTTALL, F. D., St. Helen's, Lancs, "An improved arrangement of gas-box and reversing gear, applicable to Siemens's regenerative gas-furnaces." Nov. 7, 1873.
3632.—FRASER, A. C., New Barnet, Herts, and WATSON, W., Great Ayton, Northallerton, Yorks, "Improvements in treating and utilizing sewage." Nov. 7, 1873.
3636.—DARLINGTON, F. A., St. Helen's Place, and SCOTT, P., Portland Place, "Improvements in machinery for charging and discharging gas-retorts." Nov. 8, 1873.
3639.—BOTELL, R., Birmingham, "Improvements in apparatus for regulating and controlling the flow of liquids." Nov. 8, 1873.
3641.—PEACOCK, T., Wood Green, and PEACOCK, J. C., Finsbury Park Road, "Improvements in gas cooking apparatus." Nov. 8, 1873.
3663.—INGRAM, J. G., Hoxton, Middlesex, "Improvements in the manufacture of flexible metal piping and tubing." Nov. 11, 1873.
3666.—TOUSSAINT, J., Sparkbrook, Birmingham, "Improvements in the construction and arrangements of moulds or cores for casting iron tubes and pipes and other analogous articles." Nov. 11, 1873.
3679.—SUTCLIFFE, H., and SUTCLIFFE, W., Halifax, "A new and improved safety syphon-valve tap and connexions for the same." Nov. 12, 1873.
3697.—BENSON, M., Southampton Buildings, London, "Improvements in the method of manufacturing gases for illuminating and heating purposes, and in the apparatus employed therefor." A communication. Nov. 13, 1873.
3699.—HOLMAN, S., Laurence Pountney Lane, London, "Improvements in direct-acting steam-pumps and pumping-engines, and in condensers and governors therefor, parts of which improvements are applicable to other steam-engines." Nov. 13, 1873.
3712.—TONGUE, J. G., Southampton Buildings, Chancery Lane, "Improvements in water or other fluid meters." A communication. Nov. 14, 1873.
3733.—FLETCHER, T., Warrington, "Improvements in gas-heating apparatus for laboratory use." Nov. 17, 1873.
3742.—SCOTT, H. Y. D., Ealing, Middlesex, "Improvements in the purification of sewage water." Nov. 18, 1873.
3795.—KENYON, R. W., Accrington, "Improvements in taps or cocks." Nov. 21, 1873.
3803.—TRUEMAN, H. P., Middlesex, "Improvements in apparatus for measuring liquids." Nov. 21, 1873.
3807.—ROSS, W., Glasgow, "Improvements in apparatus for supplying and regulating the quantity of water used in water-closets and other cisterns or vessels." Nov. 22, 1873.
3843.—WIRTH, F., Frankfort-on-the-Main, "A new method of introducing burning gas into melting-furnaces, and the apparatus employed therefor." A communication. Nov. 25, 1873.
3848.—LAKE, W. R., Southampton Buildings, London, "Improvements in gas-engines, and in apparatus for producing gaseous mixtures to be used in the same." A communication. Nov. 25, 1873.
3850.—ROBINSON, A. H., Dublin, "Improvements in meters for measuring water or other fluids." Nov. 25, 1873.

3868.—Parker, J. F., and Wade, A., Birmingham, "Improvements in the process of and apparatus for the manufacture of coke and illuminating gas." Nov. 26, 1873.

INVENTIONS PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF COMPLETE SPECIFICATIONS.

3762.—Huntoon, H. P., Massachusetts, U.S.A., "Certain new and useful improvements on pipe-tongs." A communication. Nov. 19, 1873.

3822.—Hawkins, J. G., Gas-Works, Sheffield, "Improvements in apparatus used in the manufacture of gas." Nov. 22, 1873.

NOTICES TO PROCEED.

2419.—Salmon, P., Burton Crescent, London, "Improvements in gas apparatus, and in gas-engines and boilers, and in apparatuses connected therewith, to warm, ventilate, and light railway carriages and other vehicles." July 14, 1873.

2454.—Jacobsen, P., Edinburgh, "The clarification and purification of sewage and polluted waters by means of precipitation." July 16, 1873.

2503.—Wheeler, C. G., Chicago, U.S.A., "An improved apparatus for distributing water and regulating and controlling the passage of fluids through pipes or tubes." July 21, 1873.

2524.—Nicholson, R., Dulwich, Surrey, "Improvements in machinery or apparatus for charging and discharging gas-retorts, and in apparatus connected therewith." July 24, 1873.

2544.—Main, E. W., Newcastle-upon-Tyne, "An improved sanitary safety-valve for preventing the admission of foul air and gases into dwelling-houses, and their escape from common street sewers and drains." July 25, 1873.

2569.—Farron, S., Ashton-under-Lyne, "Improvements in the construction of cocks or taps." July 29, 1873.

3162.—Forbes, J., and Hamilton, J., Handsworth, near Birmingham, "An improved rotary engine and pump to be driven by water or steam power." Sept. 29, 1873.

3171.—Boaz, W., Limehouse, Middlesex, "An improved instrument or apparatus for stopping or closing tubes or pipes." Sept. 30, 1873.

3325.—Black, T., Liverpool, "Improvements in appliances for cleaning, scaling, and stopping tubes." Oct. 14, 1873.

3762.—Huntoon, H. P., Massachusetts, U.S.A., "Certain new and useful improvements on pipe-tongs." Nov. 19, 1873.

3822.—Hawkins, J.G., Gas-Works, Sheffield, "Improvements in apparatus used in the manufacture of gas." Nov. 22, 1873.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

1917.—Kidd, J., Leadenhall Street, London, "Improvements in air or vapour gas-machines, and in apparatus connected therewith." May 28, 1873.

1922.—Lake, W. R., Southampton Buildings, London, "An improved method of and apparatus for generating vapour from bisulphide of carbon." A communication. May 28, 1873.

1967.—Townsend, J., Glasgow, "Improvements in treating sewage or other liquids or substances containing nitrogen, phosphorus, or their compounds, in order to deodorize or precipitate the same, and obtain useful products therefrom." May 31, 1873.

2016.—Livesey, G. T., South Metropolitan Gas-Works, Old Kent Road, "Improvements in apparatus used in the manufacture of gas." June 6, 1873.

2021.—Shanks, J., Barrhead, N.B., "Improvements in and connected with valves and waste-preventive apparatus." June 6, 1873.

2954.—Wilson, A. F., Buckingham Street, Adelphi, "Improvements in apparatus used in the manufacture of gas, and in the production of some of its constituents." Sept. 8, 1873.

3119.—Michel, C., and Frager, A., Paris, "An improved water-meter or apparatus for measuring the flow of liquids." Sept. 23, 1873.

3175.—Fischer, J., Ulm, Wurtemburg, "An improved construction of meter for measuring water and other liquid bodies." Sept. 30, 1873.

3185.—Voigt, F. G., Kentish Town, "Improvements in apparatus used in the production of gas from hydrocarbon liquids." Oct. 1, 1873.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2959.—Vaughan, E. P. H., "Improvements in the construction of and in the methods of working gas-engines." Nov. 10, 1870.

3062.—Lake, W. R., "Improvements in gas-regulating apparatus." Nov. 23, 1870.

3107.—Bayant, A., and Culley, S. H., "Improvements in deodorizing and treating sewage, and in apparatus to be employed for this purpose." Nov. 26, 1870.

PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

3136.—Fargon, L. A., "Improvements in forming the joints of iron and other tubes or pipes." Nov. 28, 1866.

W. T. ALLEN & CO.,

(Late TURNER & ALLEN,)

201, UPPER THAMES STREET,

London,

GAS & WATER ENGINEERS.

CONTRACTORS FOR THE SUPPLY OF

LAMP COLUMNS, LANTERNS,

FOUNTAINS, PIPES, &c.,

TO

GAS, WATER, & RAILWAY COMPANIES, LOCAL BOARDS, SHIPPERS, &c.

A Volume of the Newest Designs, with Price Book, forwarded on receipt of 10s.

GAS COAL

AND

HOUSE COAL.

For prices, including Waggon Hire and Railway Rate to any Station or Shipping Port, apply to

MR. PLEVINS,

MONKWOOD COLLIERIES,

NEAR

CHESTERFIELD.

NOTE.—Quotations given for the small, which for Gas and Coke results is equal to the large.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

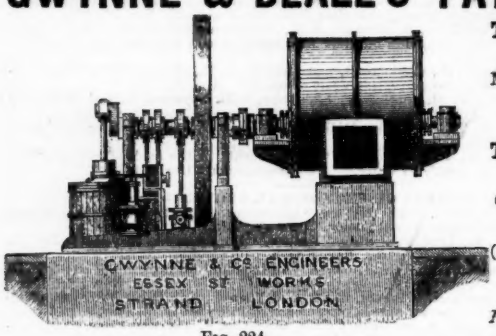


Fig. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING

MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

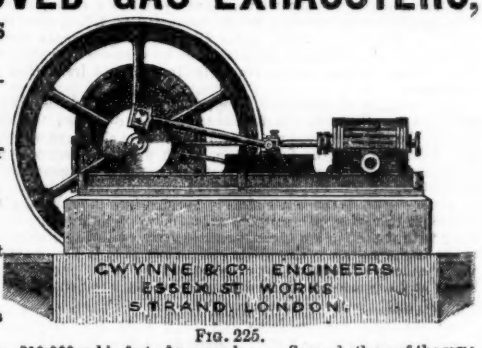


Fig. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. Gwynne and Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 *cubic feet Patent Gas Exhausters, and many of all sizes.*

DUKE OF HAMILTON'S

LESMAHAGOW GAS COAL.

The superior quality of this well-known Cannel, as wrought by

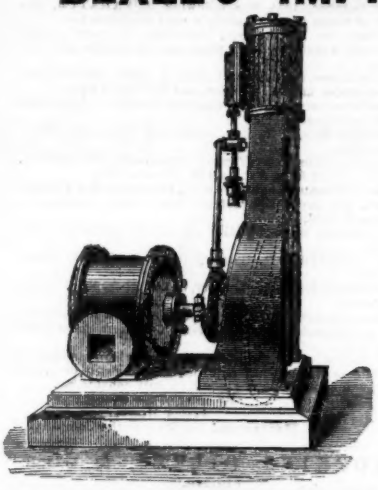
THE NITSHILL AND LESMAHAGOW COAL COMPANY,

Is now generally admitted by all Gas Engineers.

PRICE AND ANALYSIS MAY BE HAD ON APPLICATION TO

JAMES M'KELVIE, HAYMARKET, EDINBURGH.

BEALE'S IMPROVED PATENT GAS-EXHAUSTER

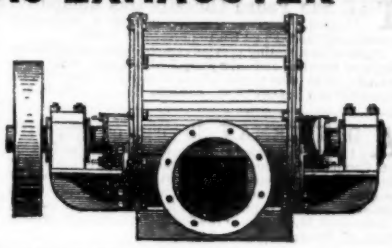


WITH

ENGINE COMBINED

ON

ONE BASE PLATE.



SOLE MAKERS,

GEORGE WALLER & CO.,

Who, since Mr. BEALE'S retirement, are the Oldest Makers.

EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS,
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

Now ready, price 1s. 6d., post free.

THE GAS CONSUMER'S MANUAL;

OR,

HOW TO OBTAIN GOOD LIGHT AND CHEAP GAS.

Being a Popular Exposition of the Chemistry of Gas Lighting, with Practical Instructions in the best methods of burning Gas for Lighting, Cooking, and Heating; and Suggestions as to the proper Sizes of Interior Pipes, Arrangement of Lights, &c., &c.

ILLUSTRATED.

By E. S. CATHELS, ASSOC. INST. C.E., MONTREAL, CANADA.

London: **WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.**

JUST PUBLISHED, a revised and illustrated Reprint, with additions, of the Paper on

RETORT SETTING AND WORKING,

READ AT THE

MEETING OF THE BRITISH ASSOCIATION OF GAS MANAGERS IN 1870,

By E. S. CATHELS, Assoc. Inst. C.E.

To be had of Mr. W. B. KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Price 2s. 6d., post free.

"The first paper read was on the 'Setting and Working of Retorts,' by Mr. E. S. Cathels, of the Crystal Palace District Gas-Works. This was an exhaustive, and, to gas managers, an invaluable paper on the apparatus used in one of the most important processes in the manufacture of gas. It is a subject to which the author is well known to have given special attention, and we therefore commend his paper to the careful notice of those of our readers who are interested in the production of gas."—*From a Leading Article in "Engineering," on June 10, 1870.*

RETORT-SETTINGS.

MR. CATHELS

IS PREPARED TO SUPPLY

TRACINGS OF DETAILED WORKING DRAWINGS

OF HIS

IMPROVED RETORT-SETTINGS

(FROM 1 TO 9 RETORTS IN A BED),

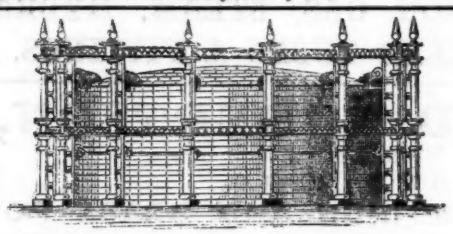
ADAPTED FOR EITHER COKE OR TAR AS FUEL,

Showing Plans, Transverse and Longitudinal Sections, and Elevations; easily understood by any retort-setter or bricklayer. These Settings are excellent gas producers, with great economy in fuel.

For terms, &c., apply to E. S. CATHELS, Assoc. Inst. C.E., GAS-WORKS, MONTREAL, CANADA.

"On the proper mode of setting the retorts the prosperity of a gaslight establishment mainly depends."—*Vide Peckstone's Treatise on the "Manufacture of Gas."*

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

WANTED, a good second-hand wrought-iron TANK, capacity from 2000 to 6000 gallons. State price, with particulars, to Mr. JOHN L. KEY, Manager, Gas-Works, CONISBOROUGH.

WORKING FOREMAN WANTED, in a small Gas-Work in Wales. Comfortable cottage and good garden. Wages 25s. a week.

Apply by letter, stating age and experience, to A. A., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, a situation as WORKING MANAGER in a small Gas-Work. Understands the working of retorts; can take meters and lay on services if required. Good character.

Address L. C., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Manager of a small or ASSISTANT MANAGER of a large Gas-Works. Thoroughly experienced in every department. Unexceptionable testimonials. Uses the photometer.

Address L. L., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, a situation as WORKING MANAGER, or to assist in a small country Gas-Works as Gas-Fitter, &c. Understands the manufacture of gas in all its branches, and has had 16 years experie nce in a large Gas-Work. Has held a similar situation, and is willing to make himself useful. Aged 31 years.

Address A. B., 3, Providence Place, Acre Road, KINGSTON-ON-THAMES.

BOROUGH OF ABERAVON.

GAS-WORKS.

WANTED, a competent Foreman or MANAGER for the above works, who understands the manufacture of gas, setting retorts, and gas-fitting.

Apply, stating salary expected, and with references as to qualifications and character, to M. TENNANT, Esq., Town Clerk, Aberavon, SOUTH WALES, on or before Monday, the 22nd of December.

COOKING AND HEATING BY GAS,

BY

MAGNUS OHREN, A.I.C.E.

GAS *versus* COAL.

Pamphlet for Gas Companies to circulate amongst their gas consumers to increase day consumption, &c.

Specimen Copy by post 4d., direct from MAGNUS OHREN, Gas-Works Lower Sydenham, London, S.E.

SOCIETY OF ARTS TECHNOLOGICAL EXAMINATIONS.

An Examination in the Technology of the Manufacture of Gas will be held (in connexion with the Examinations of the Science and Art Department) in May next.

Intending Candidates should apply for programmes (which will be sent gratis) to the Secretary of the Society of Arts, John Street, Adelphi, LONDON, W.C.

MR. HEDLEY, C.E., may be Consulted upon all matters connected with Gas, Water, and Sanitary Improvements. He is specially prepared to undertake Parliamentary, Legal, and Rating Cases, and to act as Arbitrator or Referee.

Mr. HEDLEY has devoted great attention to the vexed question of the Supply of Gas to Street Lamps, and refers to his Evidence given before Parliament upon the Birmingham, Nottingham, Metropolis, City of London, Luton, and other Gas Bills.

3, ABCHURCH LANE, LOMBARD STREET, LONDON, E.C.

PURIFIERS FOR SALE.

THREE Second-hand Purifiers, 11 ft. 6 in. by 5 ft. 6 in. and 3 ft. deep, water grooves 14 in. deep by 6 in.

For particulars apply to Mr. C. TURNER, Manager, Mirfield Gas Company, Ravensthorpe, MIRFIELD.

ON SALE, cheap, and in capital condition, One cast-iron SCRUBBER, 17 ft. high by 4½ ft. diameter.

One vertical CONDENSER, with seven double rows of 8-in. pipes 20 ft. high.

Apply to Mr. LONGWORTH, Dukinfield, MANCHESTER.

TO GAS-FITTERS.

THE Sao Pedro (Brazil) Gas Company, Limited, require the services of a thoroughly experienced GAS-FITTER to proceed to Brazil.

Applications, stating previous employment, age, whether single or married, and salary required, together with testimonials, to be sent to the Offices of the Company, No. 60, GRACECHURCH STREET, E.C., not later than the 20th inst.

A GENTLEMAN, 38 years of age, with 11 years experience in the office of a large London Gas Company, having retired in consequence of his post of chief clerk being abolished by recent amalgamations, would be glad to hear of some appointment with a provincial Company. Salary required from £150 to £200 per annum.

Address J. H. C., care of the Secretary, London Provident Bank, 26, Moorgate Street, LONDON, E.C.

AMMONIACAL LIQUOR.

THE Directors of the Birmingham and Staffordshire Gaslight Company are open to contract for the SALE of the AMMONIACAL LIQUOR produced at their works at West Bromwich and Adderley Street, Birmingham, together or separately, for a term of years to commence on the 1st of July, 1874.

Tenders will be received up to the 1st day February next, and any particulars required in the meantime may be obtained on application to the Secretary, at the Office of the Company, Old Square, Birmingham.

The Directors do not bind themselves to accept the highest or any tender.—By order of the Board,

SAMUEL WALSH, Secretary.

Old Square, Birmingham, Nov. 25, 1873.

CORPORATION GAS-WORKS, DARLINGTON.

TO IRONFOUNDERS.

THE Gas Committee of the Darlington Corporation are prepared to receive TENDERS for the supply of about 1500 lineal yards of 18-inch turned and bored GAS-PIPES; also all necessary Branch Pipes and sundry Connexions.

The specification may be seen and particulars obtained on application to the Engineer, Gas-Works, Darlington, to whom tenders must be sent not later than the 23rd inst., stating price per ton delivered at Railway Depôt, Darlington.

The lowest or any tender not necessarily accepted.

By order,

WM. B. EMMERSON, Engineer.

BRISTOL UNITED GASLIGHT COMPANY.

THE Bristol United Gaslight Company invite TENDERS for the PURCHASE of the whole or a portion of the COAL TAR made at either or both of their works, situated respectively at Avon Street, St. Philip's, and Canon's Marsh, for a term of years from the 1st day of January, 1874.

Particulars may be had on application to the undersigned.

Tenders to be sent in on or before the 23rd day of December inst.

The Directors do not bind themselves to accept the highest or any tender. By order of the Board,

HENRY H. TOWNSEND, Secretary.

Gaslight Office, Canon's Marsh, Bristol,
Dec. 12, 1873.

Published this day, price 10s. 6d.,

REGISTRATION OF DISTRIBUTORY PLANT.

The forms for this purpose are to illustrate the Paper on Distribution of Gas, read at the Edinburgh Meeting of the British Association of Gas Managers. By the use of the synopsis the whole of the out-door plant may at once be seen, with all matters pertaining to the same.

COST PRICE SHEETS, by which the cost price of every item in the Manufacture and Distribution of Gas may be shown and compared, as submitted to the Dublin Meeting of the British Association of Gas Managers. Post free 5s.

W. J. WARNER, Engineer.

South Shields, Dec., 1873.

Demy 32 mo., oblong, pp. 34.

HOW MUST I MANAGE THE GAS?

By J. O. N. RUTTER.

"This is the title of another of those useful tractates, for the correction of common errors in relation to artificial lighting and heating, for which we are indebted to the pen of Mr. Rutter, of Brighton. This little treatise offers very excellent practical advice respecting gas-fittings, taps, burners, and glasses, as well as the management of the meter. There are also some wholesome suggestions upon the subject of the proper ventilation of apartments where gas is used, and the prevention of waste in burning. The author 'tops up' with a few directions and cautions, which might fitly have been headed 'Golden Rules for Gas Consumers.'"—JOURNAL OF GAS LIGHTING, *Dec.* 2, 1873.

Intended for Gas Companies to give to their Customers.

Prices: 1000 copies, £4 4s.; 100 copies, 10s., free by post.
Apply to J. O. N. RUTTER, Black Rock, BRIGHTON.

TO GAS COMPANIES.

PATENT FUEL AND LIME CEMENT FROM GAS LIME.

This invention (protected by three patents) consists in a new method of turning the foul lime of Gas-Works to profit. The process is very simple and inexpensive, and can be worked by Gas Companies at a very small outlay.

By simply mixing the foul lime with tar it is converted in the first instance into an excellent fuel. By burning this fuel a very valuable material for building purposes is obtained, which can be used either as lime or cement or plastic. When used as cement it will be found equal to the best Portland in durability and hardness.

Licences to work the invention will be granted by the Patentee to Gas Companies on very reasonable terms.

For further particulars apply to Messrs. G. AND H. LAMB, Solicitors, KETTERING.

HARRIS AND PEARSON,
STOURBRIDGE,
Proprietors of
BEST GLASS-HOUSE POT AND CRUCIBLE CLAY;
Manufacturers of
FIRE-BRICKS, GAS-RETORTS, & FIRE-CLAY GOODS
of every description.

Orders of any magnitude, for home and exportation, executed with all possible despatch.

N.B.—A quantity of Retorts in stock. Circulars, 15 in. and 16 in. Ovals, 20 in. by 14 in. D's, 15 in. by 13 in.; 16 in. by 12 in.; 18 in. by 14 in.; 20 in. by 16 in.; 21 in. by 14 in.; and 24 in. by 14 in.

THE Scarborough Gas Company, owing to the removal of their works, will have FOR SALE, about October, 1874, the following APPARATUS, the whole of which is in exceedingly good condition:—

Fittings for 140 Retorts, consisting of mouthpieces, ascension, saddle, and dip pipes, and hydraulic and foul mains.

A Condenser, consisting of 40 12-in. pipes, with top and bottom boxes, and inlet, outlet, and bye-pass valves.

Two Scrubbers, each 7 ft. diameter and 16 ft. high, with valves as before.

Two Purifiers, 8 ft. 6 in. square and 5 ft. deep, 20-in. water lutes.

Two Cast-iron Water-Tanks, respectively 24 ft. by 16 ft. by 4 ft., and 20 ft. by 8 ft. by 4 ft. New in 1865.

Two Horizontal Engines, 4 h. p., two single-flue Cornish boilers, and two 20,000 feet per hour Beale's Exhausters. All new in 1866.

One Station-Meter, by Milne, 20,000 feet per hour. New in 1864.

One Gasholder 80 ft. diameter, in two 24-ft. lifts. About 11 years old.

One Gasholder 50 ft. diameter, in two 22-ft. lifts. Only 4 years old.

Two Governors, by Parkinson, on 12-in. and 10-in. mains.

A considerable length of 10-in. Cast-iron Socket and other Pipes.

An inspection of the above Apparatus is requested by the Officers of Companies requiring enlargements or extensions, and offers to purchase will be duly considered.

By order of the Board,
JAMES MOON,
Manager and Secretary to the Company.

HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

GAS COMPANIES
AND
LOCAL BOARDS
Requiring New Street-Lamps
are recommended
KEEN'S PATENT
DOUBLE-CLIP
STREET-LAMP.
A great improvement on the old-fashioned 14-in. Lamps.
They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.
For particulars of price, &c., apply to
WILLIAM KEEN, Sole Proprietor and Manufacturer, Robertson Street, HASTINGS.

JOSEPH AIRD,

WELLINGTON TUBE-WORKS,

GREAT BRIDGE, TIPTON, STAFFORDSHIRE,

MANUFACTURER OF

PATENT WELDED WROUGHT-IRON GAS, STEAM, HYDRAULIC, GALVANIZED, & ENAMELLED TUBES & FITTINGS.

VICKARYS AND ROBERTSON,

Late JOHN VICKARY,

ESTABLISHED 1840,

GAS ENGINEERS, CONTRACTORS, IRON AND BRASS FOUNDERS,

WEST OF ENGLAND ENGINEERING WORKS, EXETER.

GASHOLDERS AND TANKS,

Retorts, Retort-Fittings, Condensers, Scrubbers, Purifiers, Station-Meters, Governors, Rack and Screw Valves. Gas and Water Mains always in Stock.

STEAM-ENGINES, EXHAUSTERS, SHAFTING AND GEARING, &c.

GAS-FITTINGS,

Including Chandeliers, Pendants, Hall Lamps, Brackets, Star and Sun Lights of all designs.

WET & DRY GAS-METERS,

Combining most recent improvements in principle and manufacture; upwards of 200,000 already in work, giving highest satisfaction.
(A guarantee of five years given with every Meter.)

PLUMBERS WORK, including Lift and Force Pumps; Cocks for Gas and Water and Steam; Brass Fittings.

HYDRAULIC AND GENERAL ENGINEERING

LONDON OFFICE: 8, JOHN STREET, ADELPHI, W.C.

D. BRUCE PEEBLES & CO.,

ENGINEERS, &c.,

FOUNTAINBRIDGE WORKS, EDINBURGH,

PATENTEES OF

WET and DRY GAS METERS,

GAS REGULATORS,

FOR PUBLIC LAMPS, &c.

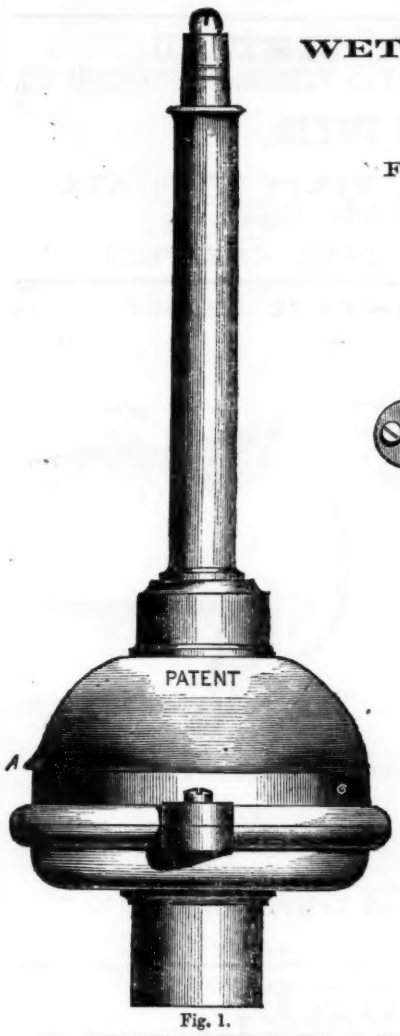


Fig. 1.

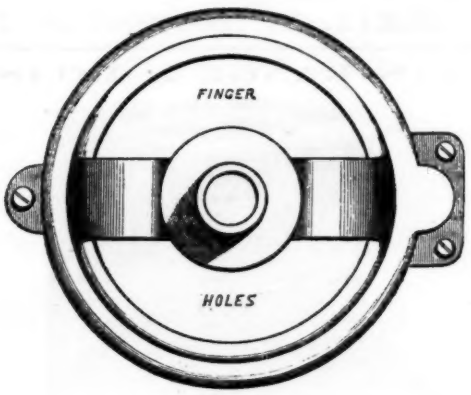


Fig. 4.

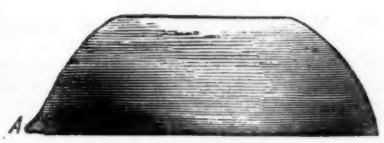


Fig. 3.

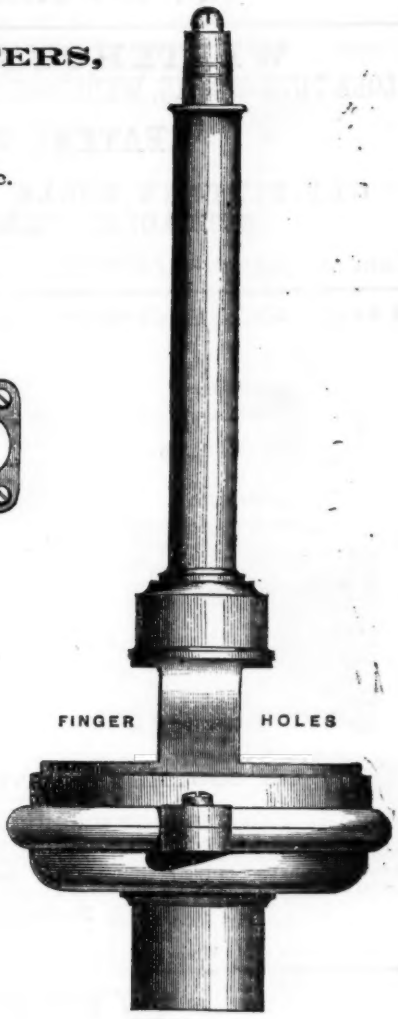


Fig. 2.

D. BRUCE PEEBLES & CO., FOUNTAINBRIDGE WORKS, EDINBURGH, have much pleasure in calling the attention of Gas Engineers, Gas Companies, and Corporations to their New Patent Lamp Regulators, which possess several advantages over any Regulators for Lamps hitherto made, as a reference to the above drawings will show.

Fig. 1 is an elevation of the Regulator, with burner complete. The inverted spout (A) of the brass cap (fig. 3) serves the double purpose of admitting air to the diaphragm, and throwing off water from those Regulators which may be exposed to rain.

Fig. 2 represents the Regulator with the brass cap (fig. 3) removed, showing finger-holes by which access may be had to the diaphragm, and it will be observed that, with this arrangement, the Regulator can be adjusted or rated without unscrewing any of its parts, while with ordinary Regulators such cannot be done unless they are taken to pieces. This is a most important advantage.

Fig 4 shows plan of Regulator corresponding to fig. 2. It will be seen that after rating or adjusting the pressure, the parts never require to be interfered with, as nothing is needed but to press down the brass cap, and fix the Regulator in its place. Another advantage is gained by the construction of the Regulator allowing the diameter to be much less than those hitherto made, without decreasing the area of the diaphragm in the same proportion. The disagreeable penumbra so much objected to is thus, to a great extent, obviated. The cases being made of cast iron, are therefore calculated to last as long as the lamp-post.

The great saving of gas, by burning it at a low pressure, is now well understood, but this desirable result can only be obtained in public lamps by using well-constructed Regulators, so that, however much the initial pressure in the mains may vary, it is kept constant and invariable at the point of ignition, thus ensuring perfect combustion and a reliable rate of consumption.

Patentees and Manufacturers, D. BRUCE PEEBLES & CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

D. BRUCE PEEBLES & CO.,

FOUNTAINBRIDGE WORKS, EDINBURGH,

MANUFACTURERS OF

STATION GAS-METERS; CONSUMERS METERS, WET AND DRY, IN CAST-IRON AND TIN-PLATE CASES; GOVERNORS; EXPERIMENTING APPARATUS.

GAS PURIFICATION.

JOHN WM. O'NEILL AND CO.,

CONTRACTORS FOR

GAS PURIFICATION BY OXIDE OF IRON,

39, LOMBARD STREET, LONDON, E.C.

WHITEHOUSE AND COMPANY, LIMITED,

GLOBE TUBE-WORKS, WEDNESBURY; & VICTORIA TUBE-WORKS, GREAT BRIDGE, STAFFORDSHIRE,

MANUFACTURERS OF

PATENT WELDED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

GAS-FITTERS TOOLS, STEAM COCKS, AND ALL KINDS OF JOINTS.

HYDRAULIC TUBES, CORE BARS, TELEGRAPH POSTS, COILS, &c.

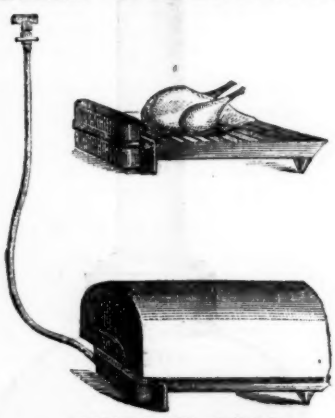
London Agent—ALFRED LAKEMAN, 18, IRONMONGER LANE, CHEAPSIDE, E.C.

THE ECONOMIC GAS-RANGE & ROASTER COMPANY,

TABLE ROASTER.

SMALL RANGE.

LARGE RANGE.



ROASTERS, Nos. 1, 2, & 3.

ON SOUTHBY'S PATENT, WHICH SECURES PERFECT VENTILATION.

A 7-lb. JOINT ROASTED TO PERFECTION FOR ONE HALFPENNY.

SELECTED BY THE COMMISSIONERS FOR THE ANNUAL INTERNATIONAL EXHIBITIONS, 1871 & 1873.

A pennyworth of gas, perfectly consumed and economized as it is under this Patent, does as much work as six pennyworth of coal. The peculiar arrangement of cannel fishtails in a chimney secures freedom from smoke even with the richest gas, and a positive immunity from every trace of smell. The simplicity in use is so great that no experience is required. Roasters from 10s. 6d. to £1 5s. Complete Ranges at £2 for small families; £3 10s. for ordinary establishments; and £6 for a Range equal in power to a large Kitchener. Estimates given for fitting up Hotels, Restaurants, and large Establishments.

Works: 2, BASSETT STREET, MALDON ROAD, KENTISH TOWN, N.W.,

Where the Apparatus can be seen in operation;

And at Mr. WOODCOCK'S Offices, 23, ABINGDON STREET, WESTMINSTER, where Mr. SOUTHBY can be consulted by appointment.

WILLEY AND FORD,

GAS ENGINEERS,

WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

ENGINEERING DEPARTMENT.

NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

GASHOLDERS AND TANKS.

RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

METER DEPARTMENT.

They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

GAS-FITTING DEPARTMENT.

An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

☞ PLEASE NOTE THE ADDRESS—

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

LYON'S PATENT WEIGHING AND REGISTERING MACHINE.

EDMUND ROBINSON,

AGENT FOR THE COALBROOKDALE COMPANY

AND FOR

TANGYE BROS. & HOLMAN.

SOLE LICENSEE FOR LYON'S PATENT WEIGHING AND REGISTERING MACHINE,

104, KING STREET, MANCHESTER.

The advantages gained by using this Machine are Accuracy, Economy of Labour, and a Check upon Fraud. The work performed by a man in any given time is shown by referring to the Index.

Price £15 15s.

For further Particulars, and Copies of Testimonials from Gas Engineers, apply to

EDMUND ROBINSON, 104, KING ST., MANCHESTER,

TO WHOM ALL REMITTANCES MUST BE MADE DIRECT.

D. BRUCE PEEBLES & CO.,

ENGINEERS, BRASSFOUNDERS, AND GAS-METER MANUFACTURERS,

FOUNTAINBRIDGE WORKS, EDINBURGH.

CONSUMERS WET METERS,

IMPROVED DRY METERS, STATION-METERS, GOVERNORS,

PATENT LAMP-REGULATORS,

EXPERIMENTING METERS, PRESSURE-GAUGES, &c.

EDWARD COCKEY & SONS,

ENGINEERS, IRONFOUNDERS, & CONTRACTORS,

FROME SELWOOD, SOMERSETSHIRE

MANUFACTURERS OF

GASHOLDERS, PURIFIERS, CONDENSERS, SCRUBBERS;

ALSO OF

STEAM-ENGINES, EXHAUSTERS, IMPROVED PUMPS FOR TAR AND LIQUOR,

SLIDE-VALVES,

AND ALL DESCRIPTIONS OF APPARATUS USED IN GAS-WORKS.

PATENTEES AND MANUFACTURERS OF THE

DRY-FACED CENTRE-VALVES,

Which are now so extensively used.

During the last year these Valves have been introduced into some of the large gas-works in London, where they are giving the greatest satisfaction. Favourable reports have been received from the engineers of these and of some of the most important works in the kingdom. The demand for them both for home and foreign works continues unabated.

Every Valve is made with covering bars, to protect ALL the faces. The Patentees found the necessity for this almost immediately after they commenced the manufacture of these Valves, and they have ever since adopted the practice. The large experience they have gained has also enabled them to introduce several minor improvements in the construction of their Valves. It is an advantage peculiar to these Valves that the covers can be easily raised, the faces cleaned and oiled, and kept in perfect condition. If managers of gas-works will periodically attend to this, the Valves will be as good after twenty years use as when first put in.

Messrs. COCKEY AND SONS have been very successful in the erection of many gasholders, some of very large size. They erected, in 1871, at Dublin, for the Alliance Gas Company, one of the largest in the kingdom; telescopic, 182 feet 6 inches diameter. It was referred to by the Chairman of that Company the following year, in his report to the shareholders, as having been in use, and working most effectively, since its erection, and being in the highest degree satisfactory to the Company.

Plans of gas-works are carefully prepared, and every improvement which long practical experience can give is introduced into works entrusted to the care of the Advertisers.

References can be given to the Directors of many Companies who have placed works in their hands, and who will testify to the satisfactory results of so doing.

WILLIAM & BENJAMIN COWAN,

ESTABLISHED 1827.

KING HENRY'S WALK,
BALLS POND ROAD,
(NEAR DALSTON JUNCTION STATION,) **LONDON, N.**

BUCCLEUCH ST. WORKS,
EDINBURGH.

Manufacturers of DRY GAS-METERS in TIN AND CAST-IRON CASES.

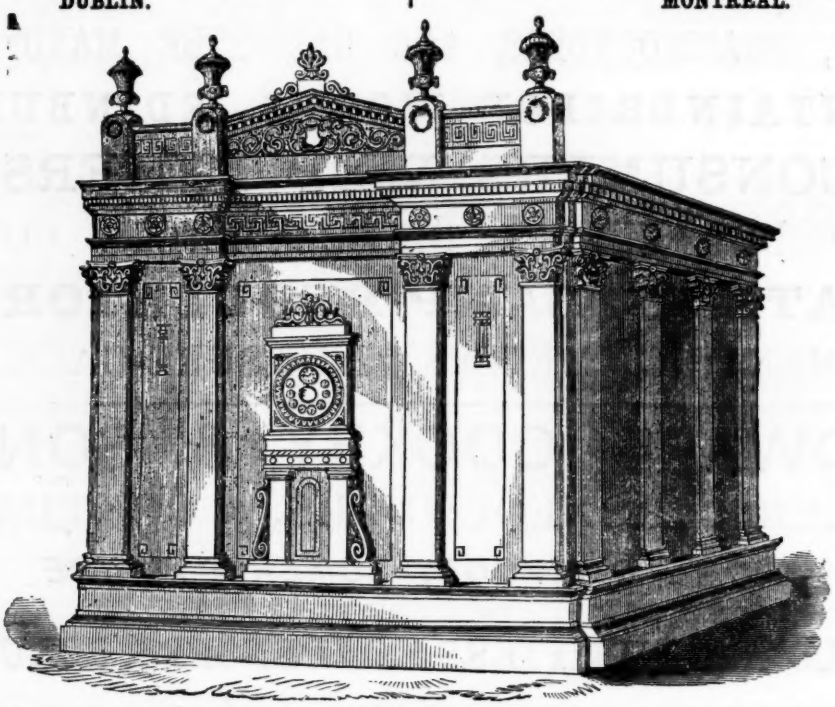
Sole Manufacturers of ESSON'S PATENT COMPENSATING GAS-METER,

AND OF **COWAN'S PATENT SIDE-VALVE GAS-METER.**

AGENTS.

Messrs. J. EDMUNDSON & Co., 36, Capel Street, DUBLIN.

Messrs. R. MITCHELL & Co., Peter Street and Craig Street, MONTREAL.



W. & B. COWAN'S SQUARE STATION-METER with PLANED JOINTS.

GOVERNORS, PRESSURE REGISTERS, TEST GASHOLDERS, GAUGES, &c.
WET AND DRY METERS SPECIALLY MANUFACTURED FOR STREET-LAMPS.

PRICE LISTS ON APPLICATION.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.

LIVESEY FIRE-CLAY WORKS.
NEAR BLACKBURN, LANCASHIRE.
(ESTABLISHED 1835.)

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,
AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

THE THAMES BANK IRON COMPANY,

(Successors to LYNCH WHITE,)

SUPPLY FROM STOCK

CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.

All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.

ADDRESS—

OLD BARGE WHARF, UPPER GROUND STREET, LONDON, S.E.

SCHOLL'S

PATENT PLATINUM

GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.

"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.

To be had retail of Gas-Fitters and Ironmongers.

JOHN SCHOLL, Manufactory: 41 & 42, BERWICK STREET;

Retail Depot: 198a, OXFORD STREET, LONDON, W.

Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

*** Further testimonials from Drs. Frankland and Crookes, showing the great practical value of this invention, will be shortly published.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.

STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, co illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

SAM. CUTLER & SONS,

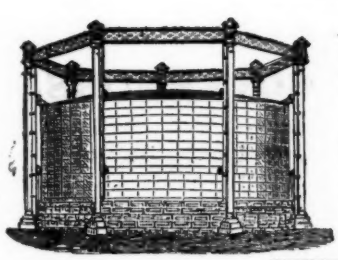
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works,** for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs,** and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers,** and **Purifiers,** of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

WORKS FOR THE SUPPLY OF

VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water,** and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.

Offices: 22, Coleman Street, LONDON, E.C.

MR. WILLIAM DORE (19 years Gas Engineer and Accountant) may be CONSULTED upon all matters relating to the manufacture and distribution of gas, and the management, accounts, or transfer of gas undertakings.

Office, 4, Picton Place, Neath, SOUTH WALES.

MR. NORWOOD EARLE, late of the Dover Gas-Works, is prepared, after 17 years experience, to undertake the duties of SURVEYOR to Gas Companies and Corporations in all matters relating to the Distribution of Gas and Gas Testing. Contracts entered into for the Survey of Mains, Services, Public Lamps, &c., in order to reduce the per centage of unaccounted-for gas to the lowest possible amount.

Valuations for Assessment, Transfer, and other purposes.

Offices, MANSION HOUSE CHAMBERS, 12, Queen Victoria Street, LONDON, E.C.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire-Bricks and every description of Fire-Clay Goods.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, LONDON, E.C.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20 & 22, WHARF ROAD CITY ROAD, LONDON, N.,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

TO GAS COMPANIES.

GEORGE McKAIG,

MANUFACTURER OF

GAS-PURIFYING WOOD SIEVES

153, CLEVELAND STREET,

DONCASTER.

It requires but one trial to prove the Superior Make, Strength, and Durability of these Sieves.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

(Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his

CELEBRATED HALBEATH STEAM COALS,

on Navy List.

B. CARPENTER'S

IMPROVED WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

22, HERMES STREET, PENTONVILLE ROAD,

LONDON, N.

The above Sieves are used by all the Gas Companies in London and a great many in the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

THE IMPERIAL METER COMPANY, LIMITED,

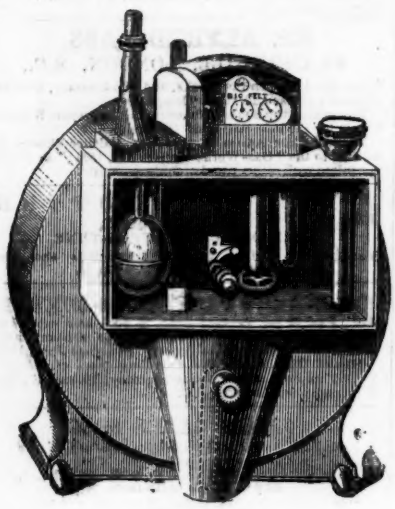
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

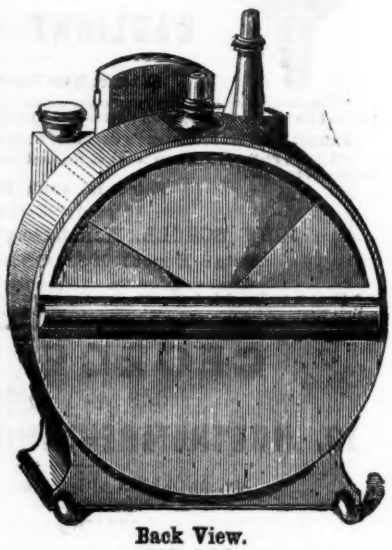
IMPERIAL

COMPENSATING

WET GAS-METER.

DE CASTRO & BURTON'S

PATENT.



Back View.

I. **This Meter is more simple in construction than the common non-compensating Meter.**
II. **An unvarying water-line is maintained.**
III. **No amount or kind of pressure will cause it to "flood."**
IV. **It is practically unaffected by "tilting."**
V. **The friction is less than in any other Meter; and**
VI. **It will last for twelve months without requiring to be refilled.**

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE COMMON NON-COMPENSATING WET GAS-METERS OF ALL SIZES, BOTH IN TIN AND CAST-IRON CASES.

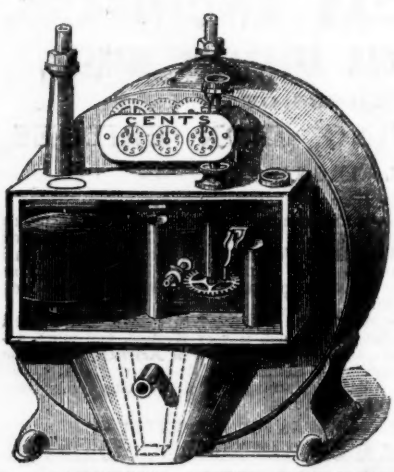
THE COMPENSATING

WET GAS-METER

IS UPHELD FOR

TEN YEARS

WITHOUT CHARGE.



THE IMPERIAL WET GAS-METER.
Non-Compensator.

STATION-METERS

WITH PLANED JOINTS,

AND

GOVERNORS,

MADE TO ORDER

Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

THE IMPERIAL METER COMPANY, LIMITED,

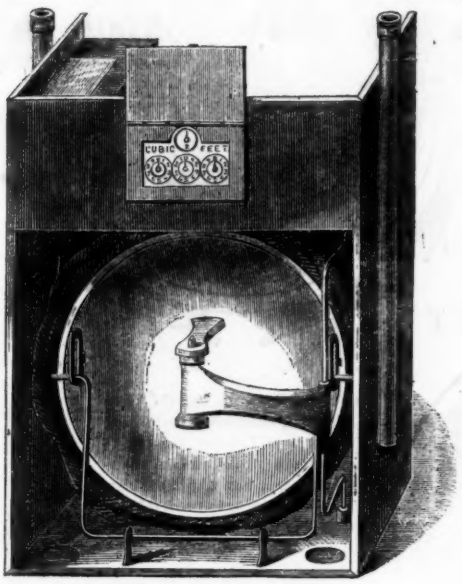
MANUFACTURERS OF

WET AND DRY GAS-METERS,

PRESSURE-GAUGES AND GOVERNORS, AND STREET-LAMP REGULATORS.

FACTORIES:

KING'S ROAD, LONDON, N.W., and GRAY'S INN ROAD, LONDON, W.C.



Front View.

THE

IMPERIAL

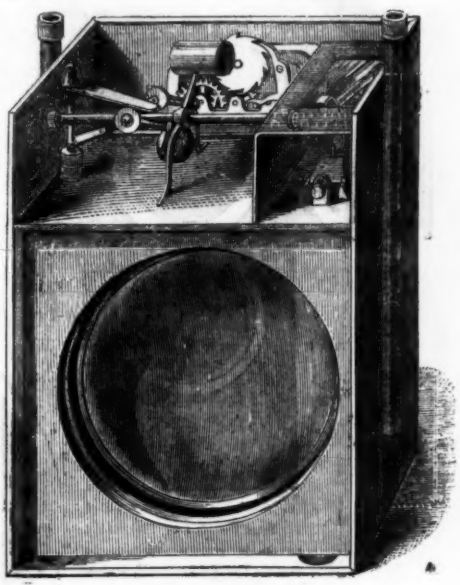
DRY

GAS-METER

SINGLE DIAPHRAGM.

TELLING & JOHNSON'S

PATENT.



Back View.

I. The mechanical construction of this Meter is simpler and stronger than any other.
II. About half as much leather is used as in ordinary dry Meters.
III. The Meter has only one valve, and this cannot "stick."
IV. The lights maintain perfect steadiness and strength of flame. There is no "draw."
V. The gas consumed can only be measured from the inlet to the outlet, and
VI. The index cannot be made to register backwards.

THE IMPERIAL METER COMPANY, LIMITED, ALSO MANUFACTURE ORDINARY DOUBLE DIAPHRAGM DRY GAS-METERS OF ALL SIZES, BOTH IN TIN AND IN CAST-IRON CASES.

SPECIAL ATTENTION

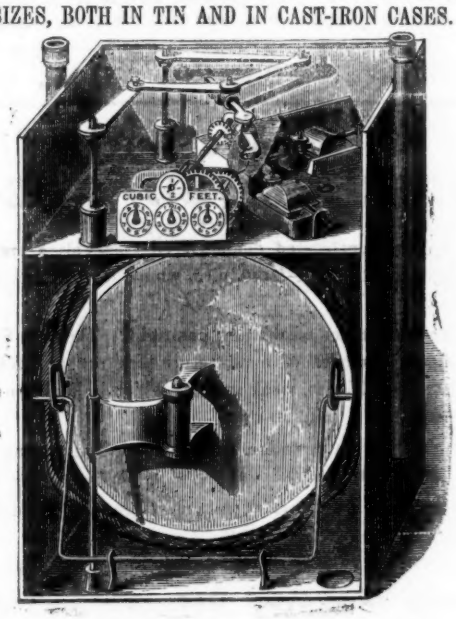
IS PAID TO THE

MANUFACTURE OF

STREET-LAMPS

AND

REGULATORS.



EVERY

DRY GAS-METER

IS UPHELD FOR

SIX YEARS

WITHOUT CHARGE.

THE IMPERIAL DRY GAS-METER.
Double Diaphragm.

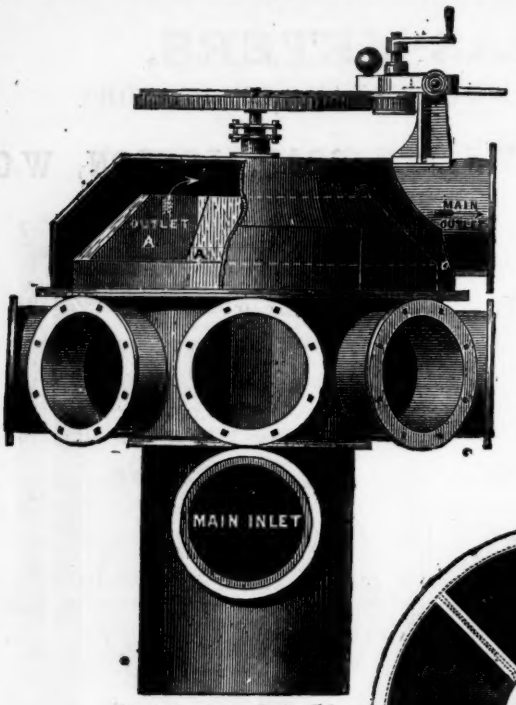
Mr. GEORGE MACKANESS will represent this Company in the Provinces.

OFFICES: 41, FLEET STREET, LONDON, E.C.

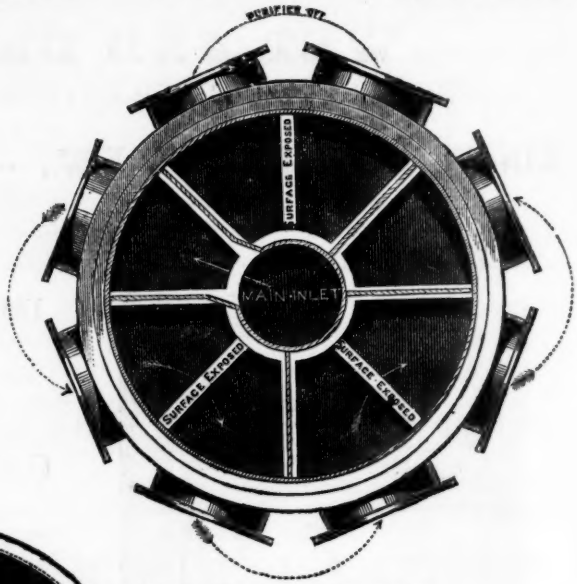
W. MOORE, Secretary.

☞ *All Communications to be addressed to the Secretary.*

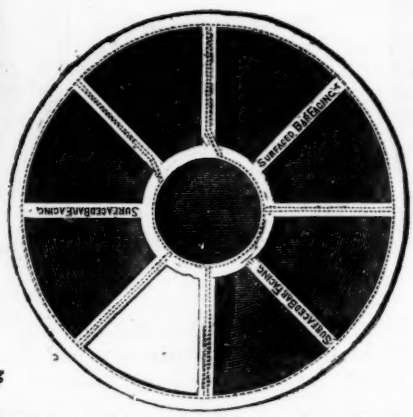
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



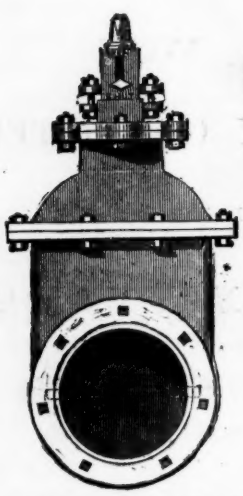
Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



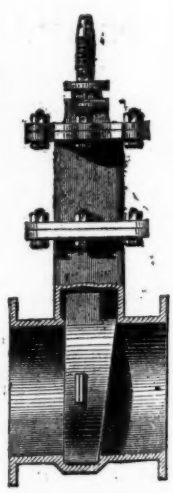
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.



C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

GASHOLDERS, TELESCOPE & SINGLE-LIFT, of LARGEST DIMENSIONS.

PURIFIERS, SCRUBBERS, CONDENSERS of most Improved Description.

WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

ALFRED WILLIAMS,
PHŒNIX FIRE-BRICK WHARF,
64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.

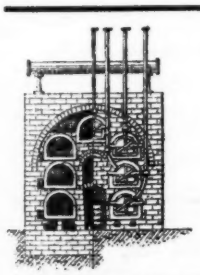
STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

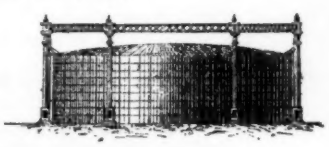
ESTABLISHED 1844.

WHITLEY PARTNERS, LIMITED,
RAILWAY WORKS, LEEDS,
ENGINEERS, FOUNDERS, AND LICENSEES;
MANUFACTURERS OF IMPROVED STEAM-ENGINES, BOILERS, PUMPS, &c.;
MAKERS, BY SPECIAL MACHINERY, OF PATENTED MECHANICAL INVENTIONS,
Comprising numerous Labour-saving Appliances and Economizers of Fuel and Motive Power;
CONTRACTORS TO THE EUROPEAN & COLONIAL GOVERNMENTS & CORPORATIONS;
MERCHANTS AND SHIPPERS OF MACHINERY, METALS, AND HARDWARE;
AWARDED
THE FIRST PRIZE MEDAL AT THE EXPOSITION UNIVERSELLE, PARIS, 1867,
"For Improved Construction, Excellence of Material, and Superior Workmanship;"
TWO GRAND GOLD MEDALS AT THE MOSCOW INTERNATIONAL EXHIBITION, 1872;
ALSO THE FIRST PRIZE MEDALS AT LEEDS AND LYONS IN 1858, 1868, and 1872.
"REDUCTION IN PRICES OF PEET'S VALVES, consequent upon largely increased sales."

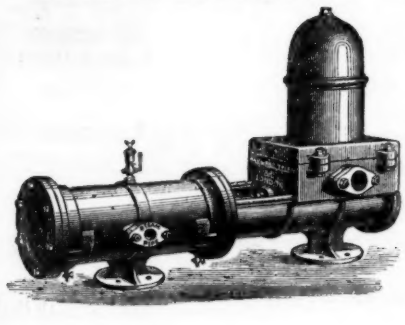
ILLUSTRATED CATALOGUES AND ESTIMATES ON APPLICATION.
Correspondence conducted in English, German, or French.

Samples of Specialties may be inspected at Stand No. 542, Group XIII., in the English Machinery Annexe of the Vienna Exhibition, 1873. For List of same see German Official and "British Section" Catalogues.



HENRY SKOINES,
PATENTEE
AND
CONTRACTING GAS ENGINEER,
FOR

SETTING RETORTS,
ERECTING AND REMODELLING GAS-WORKS
Of any extent, at Home or Abroad,
Address, 7, ARGYLE STREET, KING'S CROSS, LONDON, W.C.

THE PATENT
"UNIVERSAL" STEAM PUMP.
SOLE MAKERS,
HAYWARD, TYLER, & CO.,
84 & 85, UPPER WHITECROSS STREET, LONDON, E.C.
IN USE IN SOME OF
THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,
FOR
TAR AND AMMONIACAL LIQUORS.



Ardwick Bridge Chemical Works, Manchester, Oct. 28, 1872.

Sir,—The "Universal" Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily.—Yours truly,
(Signed) PETER HART, *Manager.*

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B Instruments, Bells, and Apparatus.
J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

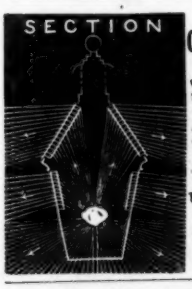
THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

E. GODDARD,
GAS-WORKS, IPSWICH,
SOLE AGENT FOR
EDGE'S PATENT
FOR REMOVING THE
CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

INTERNATIONAL EXHIBITION, 1862.
CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for
good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE.

TO GAS COMPANIES, ENGINEERS, &c.
WOOD SIEVES.—WOOD SIEVES.
Estimates given and Contracts taken by the Manufacturer
GEORGE MACKANESS,
36, EDWARD STREET, HAMPSTEAD ROAD,
LONDON, N.W.
These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.
N.B.—Specimens sent free on application.

DEMPSTER'S
RENOWNED
WOOD SIEVES,
WITH TAPER BARS,
MADE BY MACHINERY
CAPABLE OF MAKING 10,000 FEET WEEKLY.
References to Hundreds of First-Class Engineers.
ROSE MOUNT IRON-WORKS,
ELLAND, NEAR HALIFAX.



THE PATENT
CATOPTRIC LAMP
for Streets and all Situations where the Light ascending above the level of the Lamp is wasted,
Is now in use in Moorgate St., London, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.
T. A. SKELTON, 37, Essex St., Strand, LONDON,
INVENTOR AND PATENTEE.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
METAL MERCHANTS AND CONTRACTORS,
18 & 20, ALSTON STREET, GLASGOW.

CAST-IRON GAS AND WATER PIPES AND FURNISHINGS.
MALLEABLE IRON TUBE FOR GAS, WATER, AND STEAM.
AGENTS FOR THOMAS GLOVER & CO.'S
PATENT DRY GAS-METERS.
DELIVERY F.O.B. ON CLYDE.
Lists on application.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CLAYTON'S PATENT SIX-WAY VALVE only requires one valve to work two purifiers; saves more than three-fourths of the connexion-pipes; requires neither tees, elbows, nor bends; no racks or springs to get out of order.
For particulars, apply to CLAYTON, SON, & Co., Engineers, Hunslet, LEEDS.

OXIDE OF IRON.—
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

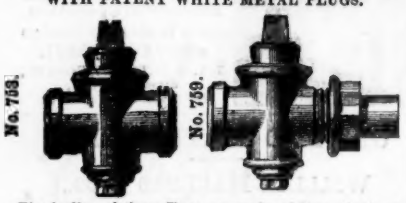
BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street E.C.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

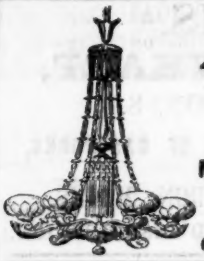
TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

LAMBERT'S
CAST-IRON GAS-MAIN COCKS,
WITH PATENT WHITE METAL PLUGS.



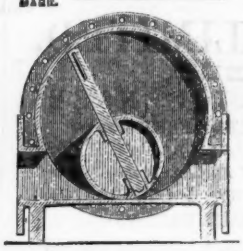
The bodies of these Taps are made of Iron, black or galvanized, and the Plugs of Patent Metal. They are warranted not to set fast or corrode as do iron or brass Cocks, will always work easily, are strong, well made, durable, of little or no intrinsic value, and, therefore, not likely to be stolen; and the PRICES are (especially upon the larger sizes) FULLY 50 PER CENT. LESS THAN BRASS COCKS.
GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.;
WROUGHT-IRON WELDED TUBE AND FITTINGS,
BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING,
Stocks, Taps, and Dies, and Every Description of Gas-Fitters Tools; Gas Slide and Sluice Valves;
CARTER'S SAFETY GAS-VALVES;
GAS-STOVES, REGULATORS, BURNERS, &c.
Pattern-Book and Price List of Gas-Fittings, supplied on application.
THOS. LAMBERT & SONS, Lambeth, London, S.E.



F. & C. OSLER,
45, OXFORD STREET, LONDON, W.
MANUFACTORY AND SHOW-ROOMS:
BROAD STREET, BIRMINGHAM.
ESTABLISHED 1807.
MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,
WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.
TABLE GLASS OF ALL KINDS.
CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

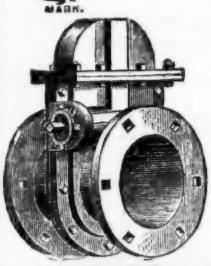
GEORGE ORME & CO.,
GAS-METER MANUFACTURERS, BRASSFOUNDERS & FINISHERS,
ATLAS METER-WORKS, OLDHAM.
CONSUMERS WET & DRY GAS-METERS ON THE MOST APPROVED PRINCIPLES.
STATION-METERS, GOVERNORS, PRESSURE-REGISTERS,
And every Description of Gas Apparatus.
GAS, STEAM, AND WATER FITTINGS.

TRADE MARK.
J. BEALE'S
PATENT
GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING
GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.
MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.
B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise.
Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES
TRADE MARK.



WITH WROUGHT-IRON PINIONS,
List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO,
SCREW WATER-VALVES WITH GUN-METAL FACES.
B. DONKIN & CO.,
GENERAL ENGINEERS AND IRONFOUNDERS,
MAKERS OF STEAM-ENGINES,
BLUE ANCHOR ROAD, BERMONDSEY,
LONDON, S.E.

TO GAS COMPANIES AND THE TRADE.
J. DEFRIES & SONS,
MANUFACTURERS OF
CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.
A LARGE STOCK ALWAYS IN HAND OF
IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,
AND EVERY DESCRIPTION OF
GAS AND WATER FITTINGS.
THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.
STREET LAMPS AND COLUMNS IN GREAT VARIETY.
WORKS: LONDON AND BIRMINGHAM.

GAS MOONS,
Cut and Engraved, of the newest designs;
GAS REFLECTORS
In Silver and Glass;
GAS NIBS
AND
BURNERS
Of every description.
Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1873, are now complete.
City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.
ESTABLISHED 1830.

OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

Analysis and price on application to Mr. Wm. Carey, Manager, Wemyss Colliery, Kirkcaldy, Fife.

THE
HUCKNALL COLLIERY COMPANY
Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the Hucknall Colliery Company, Hucknall Torkard Collieries, near Nottingham.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over 10,000 cubic feet of gas, with an illuminating power of 16 candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to Pope and Pearson, West Riding and Silkstone Collieries, near Leeds.

CANNEL COAL.
COPPA COLLIERY, MOLD,
Beg leave to call the attention of Gas Companies to the superior quality of their
CANNEL FOR GAS-MAKING PURPOSES.
This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, Flintshire.

THE MIDLAND COAL COMPANY
Are prepared to enter into CONTRACTS with
CORPORATIONS & GAS COMPANIES
FOR SUPPLIES OF
GAS COAL & CANNEL.
Prices, Analysis, and other information on application at the
MIDLAND COAL OFFICES,
118a, OXFORD STREET, MANCHESTER.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
173, ST. VINCENT STREET, GLASGOW.

RUSSEL'S BOGHEAD.

MUIRKIRK, No. 1, CANNEL
Yields 11,600 cubic feet of 34·3-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

MUIRKIRK, No. 2, CANNEL
Yields 10,700 cubic feet of 32·77-candle gas per ton, and 9½ cwts. of coke, containing only 11 per cent. of ash.

RIGSIDE CANNEL
Yields 11,900 cubic feet of 35-candle gas per ton. Coke worthless.
Prices and full Analyses on application.

SCOTCH CANNEL COALS.
The Subscriber is prepared to contract for the supply of all the principal Scotch Cannel Coals. Prices and Analyses of the various Coals will be forwarded on application.
JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET, EDINBURGH.
Established 1840.

LEE and JERDEIN,
COAL OWNERS & MERCHANTS.
Chief Office:
9, LANCASTER PLACE, STRAND, LONDON, W.C
SOLE VENDORS FOR
LONDON & THE SOUTHERN COUNTIES
OF
WIGAN COAL AND CANNEL,
From the Mines of the
INCE HALL COAL & CANNEL COMPANY, Limited,
AND
Messrs. W. H. BRANCKER & Co.

EVERY DESCRIPTION
OF
GAS COAL AND CANNEL
SUPPLIED BY
E. FOSTER & CO.,
COAL and CANNEL
MERCHANTS,
21, JOHN STREET, ADELPHI,
LONDON, W.C.

Prices Quoted on application.

CANNEL COAL.
ELLIS LEVER & CO.,
GAS COAL MERCHANTS,
107, PICCADILLY, MANCHESTER.
ALL CLASSES OF
ENGLISH, SCOTCH, & WELSH CANNEL COALS.

ALBERT GAS COAL.
THE DERBYSHIRE
SILKSTONE COAL COMPANY,
LIMITED,
CAN OFFER A
GAS COAL
Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10·375
Weight of coke in lbs. per ton of coal	1402

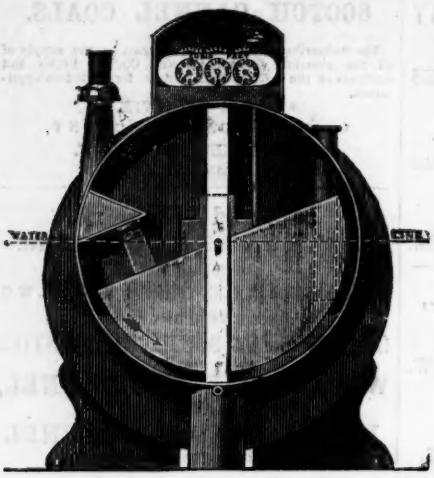
Analysis and Prices on application to
MR. EDMUND TAYLOR,
SECRETARY,
ALBERT COLLIERY, NEWBOLD,
near CHESTERFIELD.

G. J. EVESON,
GAS COAL MERCHANT,
STOURBRIDGE.
Delivery per Rail to any Part.

PRICE'S PATENT COKE & COAL BARROW,

effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. Price, Inventor and Patentee, Gas-Works, Hampton Wick, Middlesex.

DUKINFIELD CANNEL COAL.
THE DUNKIRK COAL COMPANY.
OFFICES:
ASTLEY DEEP PIT, DUKINFIELD.
ANALYSIS, PRICES, AND OTHER INFORMATION, ON APPLICATION AT THE ABOVE OFFICES.



THE

UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."—Thos. G. Barlow, C.E.

Over 90,000 in action.

MANUFACTURERS:

THE GAS-METER COMPANY,

KINGSLAND ROAD, LONDON;

WITH

Branch Manufactories at DUBLIN and OLDHAM.

ALEXANDER WRIGHT & CO.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS

of the highest excellence.

STATION-METERS AND GOVERNORS.

STREET-LAMP REGULATORS.

TESTING APPARATUS

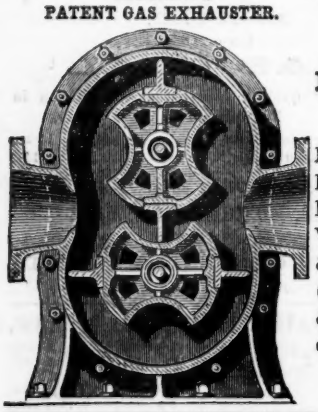
of the most perfect description for all purposes relating to Gas.

NOW READY.

"GAS MEASUREMENT AND GAS-METER TESTING," by F. W. HARTLEY, A. Inst. C.E. Third Edition, cloth boards, 2s.; per post, 2s. 2d.

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.

LAIDLAW'S PATENT GAS EXHAUSTER.



R. LAIDLAW & SON,

GAS ENGINEERS, CONTRACTORS, IRON & BRASS FOUNDERS,

Iron-Works and Foundries, GLASGOW,

Meter-Works & Brass Foundry, EDINBURGH,

Manufacturers of GASOMETERS & GAS APPARATUS of EVERY DESCRIPTION; CAST-IRON PIPES, all sizes, cast in DRY SAND and VERTICALLY by PATENT MACHINERY; IRON ROOFS, COLUMNS, BEAMS, & GIRDERS; BOILERS, TANKS, & CISTERNS; VALVES, Screw, Rack and Pinion, &c., for Gas and Water, with Iron or Gun-Metal Facings, &c.; WROUGHT-IRON TUBE and FITTINGS for Gas, Water, or Steam; GAS-METERS (Wet and Dry) of the most approved Construction, STATION-METERS, GOVERNORS, &c.; GASELIERS, BRACKETS, PENDANTS, PILLARS, & GAS-FITTINGS of every description; LAMP-POSTS and LANTERNS for Streets, &c.

London Address: 106, CANNON STREET, E.C.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

Invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT IRON PIPE, BLACK & GALVANIZED. COPPER, TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—65s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern-Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by William Boughton King (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, December 16, 1873.